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1958

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

Petrochemicals outlook: Good, but there are pitfalls, too 42

Imports plan: Pros outweigh cons 13
New legislative approach for gas? 15
Indiana readying 60-40 Arabian deal .. 22
Alaska: 9 big targets for oil hunters ... 24
Additives help overcome 'rumble' 72
Needed in French Africa: One oil law .. 78
What power is best for pipelines? 86
Forecasters see demand rising in '59 ... 92

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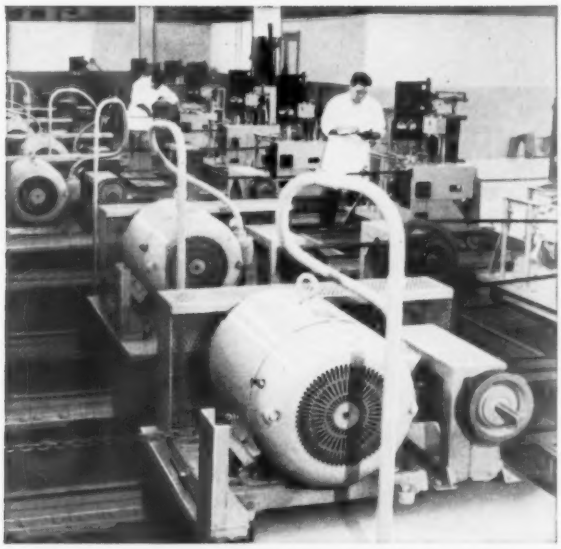

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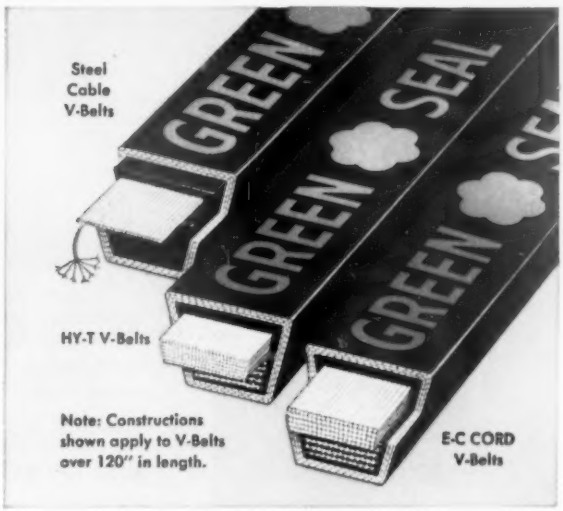

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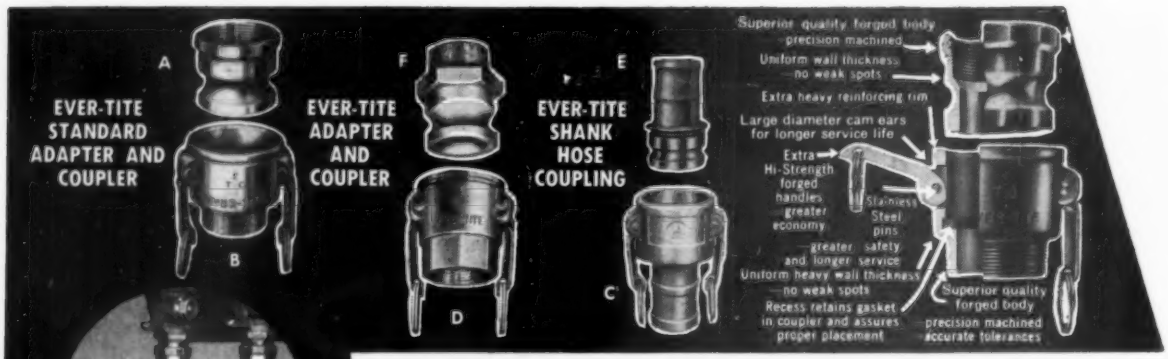
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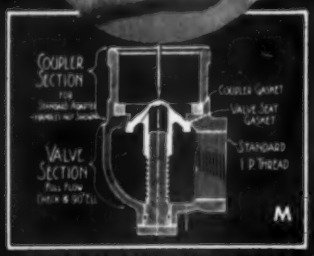

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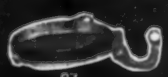
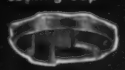
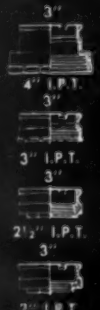


97 Locking Cap



97 Twisting Cap

97 Adapter No. 97 Ever-Tite Fill Cap



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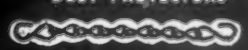

Chain for attaching Dust Caps or Dust Plugs to adapters or couplers

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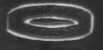

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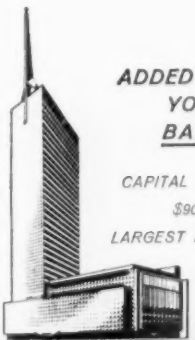

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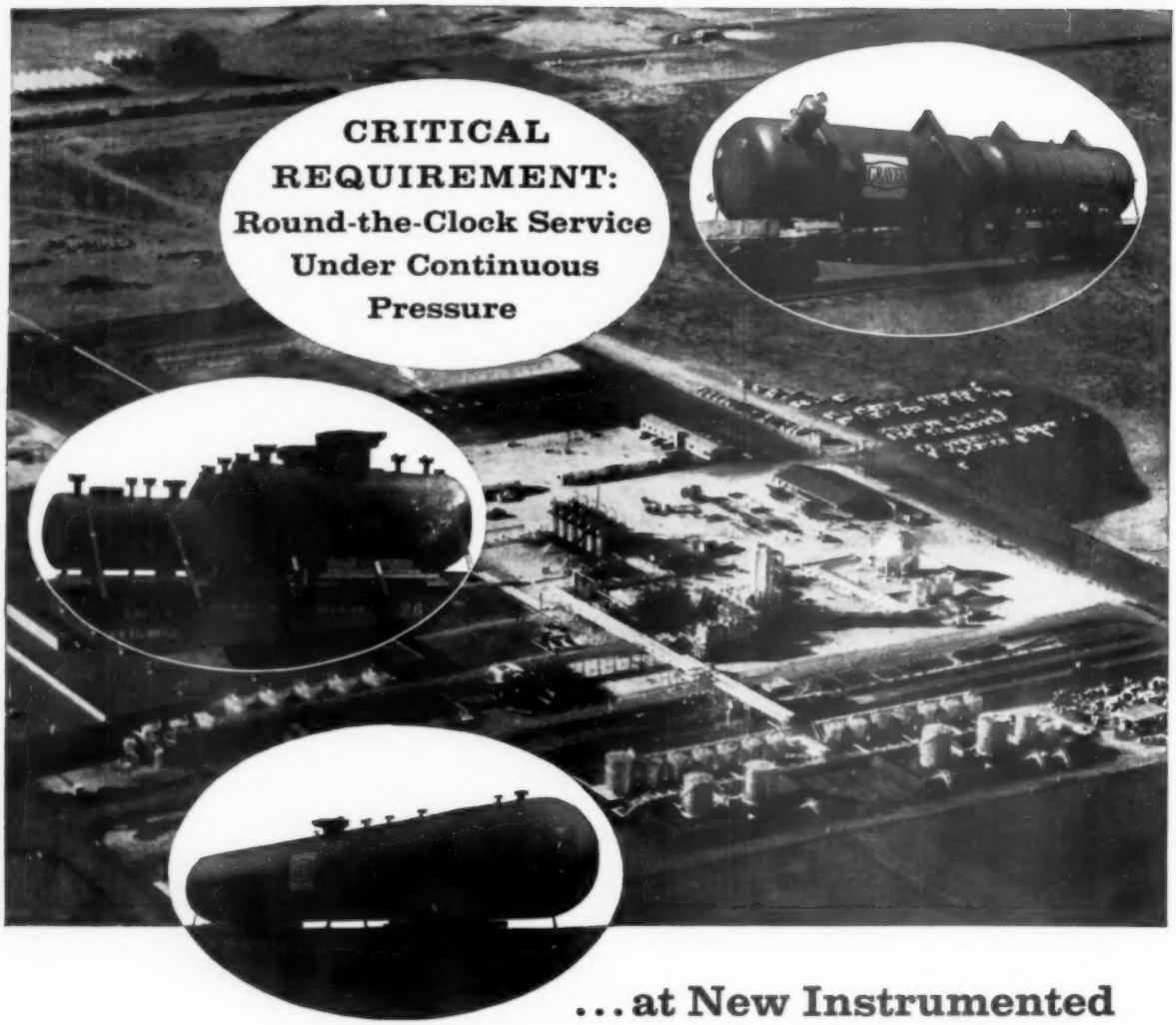

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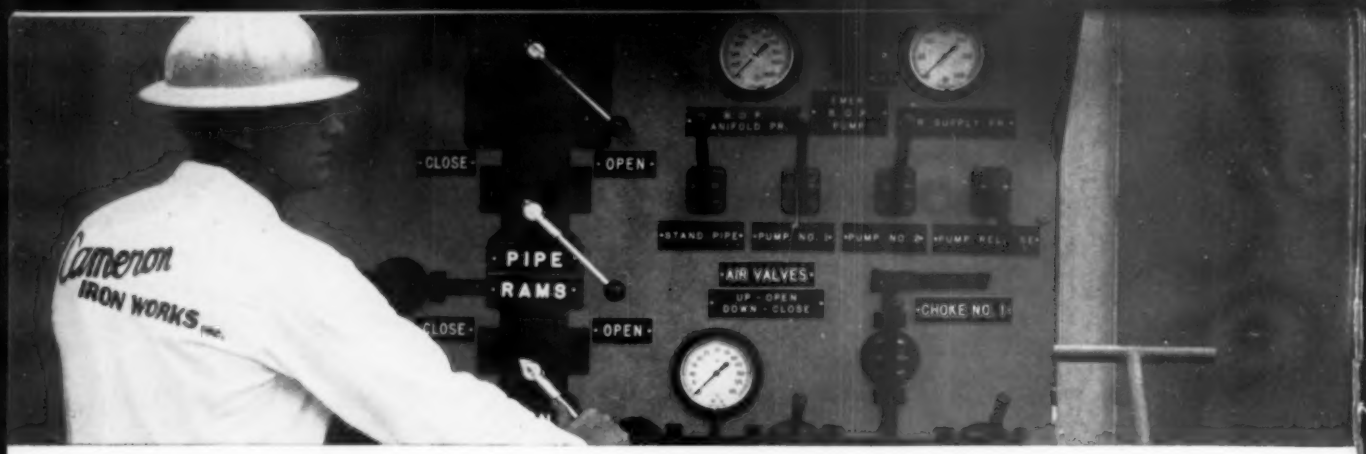

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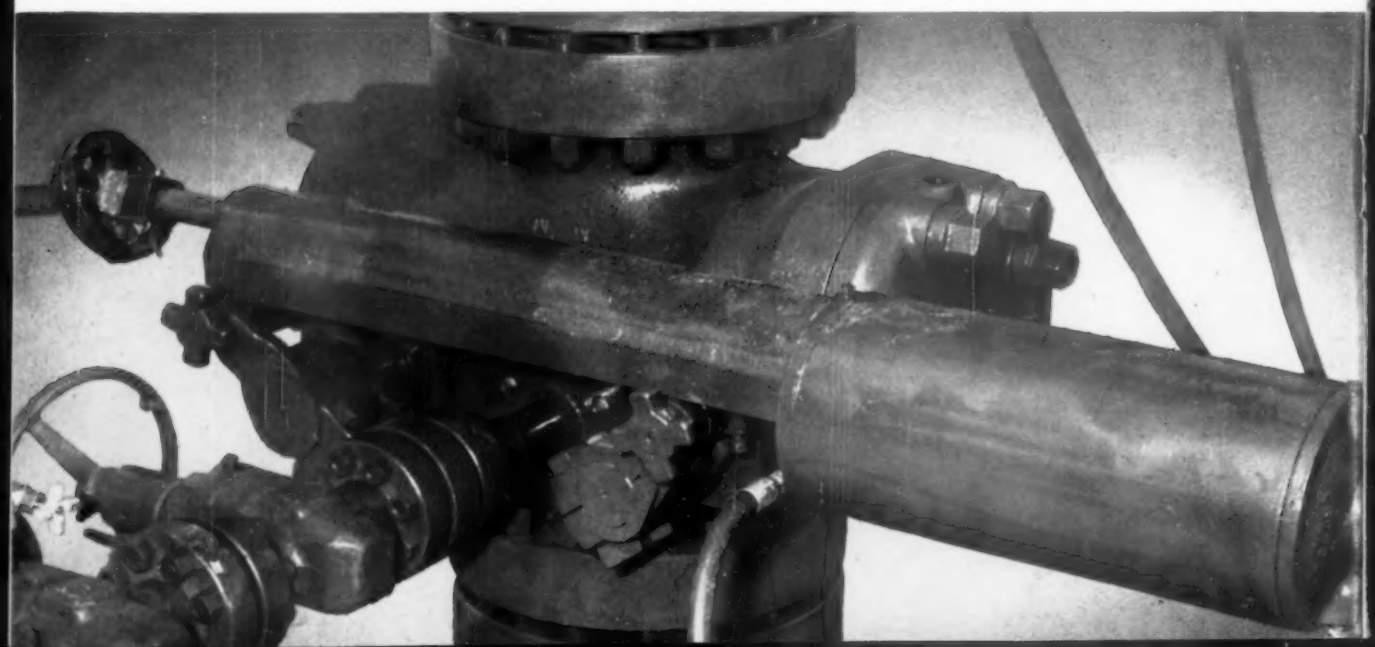

60-Second Summary / WHAT'S HAPPENING IN OIL

AT-A-GLANCE PETROLEUM WEEK Copyright

September 19, 1958

dept/INDEX

Production	24
Transportation	86
Processing	72
Marketing	92
Washington	20
Statistics	101
The Market Trend	102
Key Prices	104
Editorial	110
International	78
Letters	98
Personals	96
Petroleum Comments	22
Service & Equipment	106
Special Report	42

Watch for a move to hike the federal gasoline tax again. The government's highway fund is running short, and you can guess who is apt to be tapped to fill the gap. . . . p. 20

•

The petrochemicals industry has a bright future, but it has problems, too. Some who leaped in without much of a look find they are in a highly competitive field. A Special Report points out the pitfalls as well as the opportunities. . . . p. 42

•

The real pressure being put on oil companies abroad is for greater export volumes, because the producing countries want bigger markets. There are growing variations, too, from the "50-50" pattern, but these apply to newcomers and can be attributed at least in part to greater value of concessions. . . . p. 22

•

The proposed import plan would equalize imports among refiners and would guarantee domestic producers a share of the market. But the plan is already under sharp attack from some importers (page 14) who demand major changes. . . . p. 13

•

Asphalt makers have won a battle—exemption from imports controls—but they still face other big problems, including more competition from cement. . . . p. 16

•

"Alaska will become one of the most prolific oil and gas areas in the WORLD"—M. T. Halbouty. The independent operator from Houston bases his forecast on a trip to Alaska and on studies made of the geology of the new state. . . . p. 24

•

More details are becoming known about an "antirumble" fuel which Cities Service has developed. Basically, it centers around an additive containing phosphorus. But it also includes changes in the composition of the fuel itself. . . . p. 72

•

A cost yardstick is now available to help determine what power to use in a pipeline pump station. A recent study covers installation costs, fuel costs, maintenance, and other factors to be considered. . . . p. 86

•

The natural gas industry may shift its aim to a new legislative target. If the Supreme Court affirms the Memphis case decision, an effort will be made to get Congressional action to offset the impact. . . . p. 15

•

Optimism keeps cropping up in marketing circles. For instance, Tidewater's J. G. Jimenez predicts a domestic demand increase of 4% or 5% in 1959. . . . p. 92

Up to the Minute / SIGNIFICANT LATE NEWS

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September 19, 1958

Gulf Oil Corp. is the latest company to threaten to pull out of the voluntary imports control plan unless the proposed new plan is modified. Gulf opposes the plan because it feels it amounts to a subsidy to refiners "who have neither the intention nor the facilities" to refine imported crude. Further, Gulf said, the plan hits at those who have made huge investments overseas. Earlier, some other firms had voiced similar objections (page 14).

•

It may be years before a price yardstick is established for natural gas producers. Arthur Kline, an FPC commissioner, indicated that this week with these observations: No final commission action on the Phillips rate case is likely before mid-1959 or later. The ruling will then probably be taken to court, creating further delay. And when all that is settled, other cases are likely to be brought up to seek modifications of the FPC standard. All this could take maybe five years, maybe ten.

•

Kerr-McGee may acquire another Oklahoma crude gathering system —its fourth this year. It is negotiating for a Magnolia Pipe Line system which gathers up to 7,000 b/d in six central counties. Magnolia Petroleum, which buys 38,500 b/d in the state, would continue as a purchaser through other systems.

•

Antitrust aspects of the proposed merger of El Paso Natural and Pacific Northwest will not be considered in FPC hearings, which began this week. The Justice Dept. is trying to block the merger of the two gas transmission firms, but FPC is going ahead with consideration of their applications. Technically, FPC will not rule on the merger, but on whether to permit Pacific Northwest to abandon facilities and, if so, whether to permit El Paso to take them over.

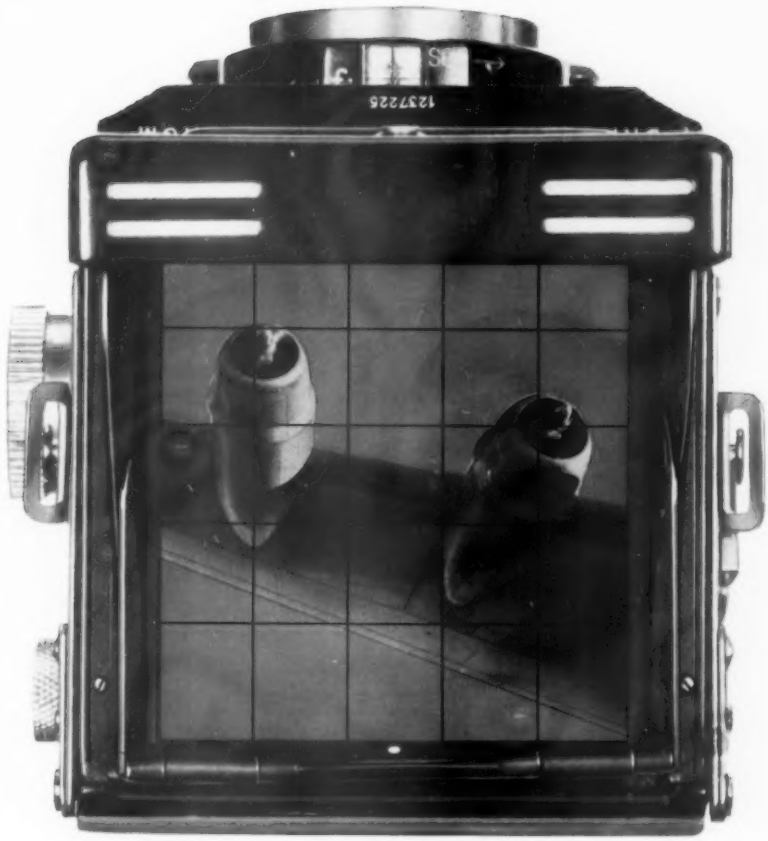
Six states favor the merger, while one is opposing it. Texas, Arizona, New Mexico, Nevada, Wyoming, and Idaho have told FPC they favor the plan. California is objecting, saying it doesn't want to rely on a single supplier. El Paso's president, Paul Kayser, says in reply that there already are applications before FPC by other firms that want to pipe gas to California.

•

Humble has been given permission to build the largest gas processing and cycling plant in America. The Texas Railroad Commission has approved the firm's proposal to build a $77-million plant on the King Ranch in Texas to handle production from Seeligson and other fields in Southwest Texas (PW—Mar.21'58,p43).

•

U.S. Sen. Clinton Anderson thinks the oil industry should support a "thorough" congressional review of the depletion provision. Such a hearing, the New Mexico Democrat believes, would help reverse the "seeming trend" in Congress toward a reduction. He noted that past investigations have always confirmed the need for the provision.



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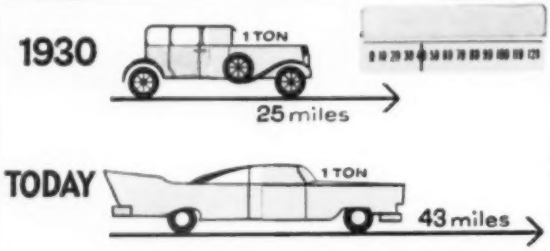
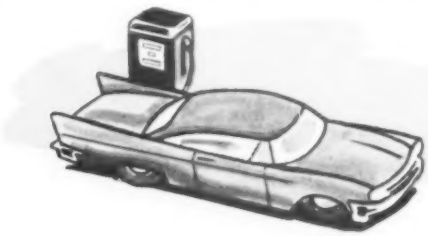
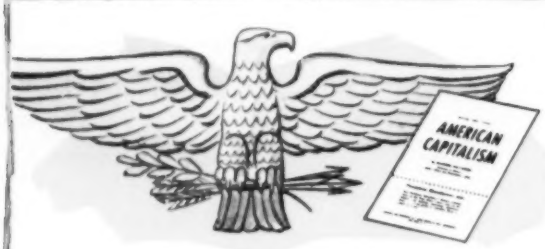


2. Ethyl's recent study—"A New Concept of Gasoline Progress"—up-dates our previous "2 Equals 3" study. It shows the great strides made in gasoline quality, and the very real benefits to the motoring public.



3. Already, many oil companies are making effective use of this new concept. Directed to oil company employees as well as customers, it can help create a better understanding of gasoline quality and prices.



4. In another public relations area—the business community—Ethyl has received a commendation from the Freedoms Foundation for its publication and distribution of the booklet called "American Capitalism."

5. And as you know—Ethyl men everywhere are not only interested in, but are *active* in, Industry public relations. In fact, it's a matter of special pride to us that a number of our men have been honored by OIC awards.

Public relations activity, promoting a favorable climate for the Oil Industry, is an Ethyl service—typifying our belief that service is just as important as product.

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Import Plan Equalizes Refiners

The proposed voluntary control program restricts imports to refiners. Industrywide, it requires that nine out of ten barrels of oil processed be of domestic origin. But the plan still may have to be modified.

The proposed new import plan offers two basic advantages to the industry: (1) It puts all refiners on an equal footing in the use of foreign crude; and (2) it gives domestic producers a guaranteed percentage of the total U.S. market.

Those are the significant impacts of the recommended voluntary plan as it is now written. But there are many indications that some modifications will have to be made to the plan proposed last week by Matthew V. Carson, the imports administrator (PW—Sep.12'58,p11).

In fact, some companies already say they will demand major changes in the method of allocating permissible imports (page 14).

But regardless of the complaints over the allocating procedure, it is most likely that the voluntary plan to become effective Jan. 1 will still be geared to refinery runs.

With all refiners east of the Rockies having an equal percentage of imported crude to run or sell, the advantage coastal refiners have had over inland refiners in some market areas will be eliminated.

This advantage held by the coastal plants has been criticized particularly by the smaller inland refiners, who charge that the coastal plants have invaded their markets with products made from lower-priced crude.

And while many of the inland refiners undoubtedly cannot use the available import allocation in their own plants, because of transportation costs, they will be in a position to sell imported oil at a profit—with the net result that their raw material costs will be lowered to about the same level as coastal refiners who can use foreign oil more readily.

While it is being charged that such an allocating procedure will permit some inland refiners to make an "unearned profit" by disposing of imported oil to other plants, the existing system of assigning quotas, based on "import history" plus arbitrary allocations to newcomers, had got completely out of hand.

As new requests for quotas came in—primarily from inland refiners with no import history—the only way the import "pie" could be divided was to cut back the established importers to "make room" for newcomers.

Some inland refiners undoubtedly will find it necessary to dispose of their imported crude to others, a practice that is being followed now. The only difference is that the new plan gives official government blessing to such a move. Such third-party deals originally were to be banned under the existing plan, but later they were permitted—more or less by default.

The guaranteed percentage of market demand means that for each 10 bbl. of raw petroleum materials refined east of the Rockies, 9 bbl. will be of domestic origin.

The over-all permissible import volume—crude and unfinished oils—east of the Rockies will be based on 10.1% of estimated total demand. It will be adjusted every six months by the Bureau of Mines to take care of fluctuations in demand.

Under such a system, the over-all level of required domestic production—crude and natural gas liquids—can now be predicted with much greater accuracy.

And if the Bureau of Mines' forecasts for future six-month periods are followed by domestic producers, crude buyers, and state regulatory officials, some of the oversupply that has previously resulted as both importers and domestic producers tried to "crowd" the market should be eliminated.

In effect, the proposal to gear imports to a percentage of estimated demand gives added significance to the Bureau of Mines' forecasts.

The Bureau makes annual forecasts (usually revised shortly after mid-year) of demand and supply, broken down by quarters. It also estimates each month the expected market demand for crude, broken down by producing states. Included in those monthly crude forecasts are estimates of total refinery runs, gasoline demand, and gasoline yield.

But frequently, the bureau's forecast has not been considered any more seriously than a weather forecast.

The proposed system of allocating imports is not without its faults, however. The biggest danger is that it will tend to encourage excessive refinery runs almost immediately.

The first allocations to be established under the proposed plan will cover the January-June period of next year. Individual allocations will be based on refining capacity, rather than runs.

But for the allocations that will become effective for the July-December period of next year, quotas for the present smallest importers will be based on 9% of their runs during the 12-month period ending next Mar. 31.

And for all importers, the individual allocations that will become effective for the six-month period starting Jan. 1, 1960, will be based on the percentage that the total of all allocations bears to the total refinery runs for the 12 months ending next Sept. 30.

For each six-month period after January, 1960, individual allocations will be determined by the percentage that the total of all allocations bears to the total of refinery runs for the 12 months ended three months prior to the effective date of the import quota.

Unnecessarily high refinery runs will, over the long run, serve to lower the percentage of the import permissible assigned to each refiner. But the danger exists that in-

dividual refiners will tend to "run to the limit" to establish a high run history.

But since the volume of permissible imports will be relatively constant—based on the past trend of demand growth—high runs will reduce the percentage assigned to each refiner.

However, the use of history to establish allocations will encourage refiners to run at levels that will risk creating an oversupply and, ultimately, breaking prices for some products, purely to "hold their own" on import quotas with their competitors.

Some industry observers—including those who urged an import plan geared to refinery runs—predict that refinery runs through next March will be close to capacity.

According to a Bureau of Mines report last week, refining capacity east of the Rockies as of last Jan. 1—the basic date being used in the new imports proposal—totaled 7,918,755 b/d, including operable capacity now closed down.

Also, the plan as now written, will encourage refiners with sizable spare capacity to line up processing deals.

Such arrangements won't necessarily boost runs for the industry as a whole. But it would give the largest refiners an import advantage over others.

Under the plan, the refiner processing the crude under such arrangements gets the "run history" for future allocations—not the "customer" company that imported the crude.

The proposed new import plan will do nothing to change the advantage now held by companies with the cheapest foreign reserves.

Any individual refiner's imports will be limited to approximately one barrel out of each ten processed. The cost of domestic crude is about the same to all refiners in a given area. But the advantage still remains with the company that imports its own foreign production from areas of large reserves and low costs.

The proposed allocation procedure is confusing on at least two important counts. First of all, no mention is made of combining refinery runs (and import quotas) of subsidiary companies—a practice that Interior Dept. officials say can't be done.

PETROLEUM WEEK was told that parent companies will not be permitted to "lump" the runs of their subsidiaries to determine an over-all company quota. Each company will have to stand on its own corporate structure to determine quotas, it was learned.

This affects primarily Indiana Standard, Jersey Standard, and Socony Mobil.

Each of their affiliates with refining capacity in the U.S. would be entitled to a quota. But each affiliate would have to import the crude itself before the imported oil could be transferred to another affiliated company.

Also, some importers are not sure how they will have to apply their percentage share of imports to their refinery runs.

The proposed procedure to determine such individual percentage allocations is based on the past history of total refinery runs.

The question in the minds of some company officials is whether they will multiply their individual percentage by their own runs in that particular past period, or by the level of their current runs in the period to which the allocation applies.

The plan as of now does not answer that question.

Dissenters Threaten to Revolt

The sharp attacks made on the proposed import plan by some importers could threaten the continuance of voluntary controls.

Some criticism had been expected, since switching to the recommended plan will require cutbacks in imports by some companies, and will give quotas to many companies for the first time.

But it had been anticipated that a plan geared to refinery runs would be generally acceptable to the industry, since it appeared to be about the only way remaining to control imports short of mandatory regulations.

A strong blast from Atlantic Refining Co., which threatens to end its voluntary compliance unless the new plan is modified, took many in the industry by surprise.

Atlantic said "it is unthinkable" that the proposed plan should be "imposed" on the industry. The company said it was confident that some modifications, "recognizing individual company circumstances," would be made. But it added: "If such modifications are not forthcoming, Atlantic will have no choice but to terminate its heretofore complete compliance with the voluntary program."

So far, Sun Oil Co. has been the only company to say it would not comply with the existing voluntary plan. Sun, which has nevertheless held its imports at or below the "quota" assigned it, challenges voluntary programs on antitrust grounds.

The company so far has not changed its views.

Atlantic wants an import plan that would take into account the investments that it and other companies have made overseas. "The new plan," Atlantic charged, "violates the most fundamental principle of private enterprise; namely that companies which assume the risk of investment in productive facilities are entitled to expect a fair return from their investments."

The Texas Co. also prefers a plan that would provide an allocation that "will assist in the protection of those assets which we have developed abroad." Too, the company would like a modification that would require all importing refiners to process their allocations in their own plants.

Tidewater Oil Co. said the proposed plan "will result in an unearned profit for inland refiners . . . and places the federal government in the awkward position of sponsoring windfall profits for a special group."

The company said it was "astounded that the government would suggest a program based on such questionable principles."

The Texas Independent Producers & Royalty Owners Assn., which had criticized the plan before it came out, claimed it is inadequate.

A detailed statement by Eugene M. Locke, TIPRO president, pointed out the lack of effective means of enforcement, the limitation to areas east of the Rockies, the "too high" level of permitted imports, and the lack of control over finished products.

On the other hand, the Independent Petroleum Assn. of America said the new plan is "encouraging as a constructive step toward establishment of a definite long-range program for limitation of imports."

IPAA officials said they would submit suggestions within the 30-day period that the plan is "open for suggestions." The association commended the responsible government officials for their "sincere and able efforts to devise a workable program."

Standard Oil Co. (N.J.) said it was studying the proposal, but that initially it "certainly seems to be sound."

Many other companies said they would not comment until they filed suggestions with the Interior Dept.

'Memphis Case' May Become New Target

The gas industry is getting set to appeal to Congress if the Supreme Court upholds the Memphis case decision.

The intent to move quickly if there is an adverse ruling was made clear this week at the annual meeting of the Independent Natural Gas Assn. of America, in New Orleans.

Obviously, gas industry leaders do not know what the high court's ruling will be. But they want to be prepared to act if the ruling is against them.

The Memphis case decision has been a thorn in the industry's side since it was handed down by a lower court, because it requires interstate pipeline firms to get the consent of their customers before they seek a rate increase.

Many consider it the gas industry's No. 1 problem—along with decontrol of producers. And since hope for Congressional action to free producers has run into so many setbacks, an effort will be made to unite the industry's segments into a drive to counteract an adverse decision—if there is one—in the Memphis case.

In fact, the drafting of proposed legislation to rectify a possible adverse decision already is under way.

J. J. Hedrick, the association's outgoing president, told the association this week: "Our legal committee has been instructed to commence the drafting of proposed legislation to correct this situation in the unlikely event the Supreme Court affirms the Memphis case decision.

"If this legislative remedy must be followed, I believe all segments of the industry will see the imperative necessity of supporting it wholeheartedly if we are to go forward to our united effort to promote the growth of our industry."

Should the Supreme Court uphold the lower courts, Hedrick said, there will be "a period of uncertainty for all segments of the industry," and the situation would be "difficult to live with."

But, he declared, "Memphis is not going to put us out of business, although it would add to our already complex corporate lives."

However, the principle of freeing the producer from burdensome regulation isn't being abandoned.

This was illustrated by Hedrick's remarks that the industry should "go ahead with a unified and firm determination" for passage of producer legislation, because it is "in the public interest."

And Glenn W. Clark, president of

GLENN W. CLARK, new head of INGAA.

Mississippi River Fuel Corp., and new president of INGAA, asserted:

"I continue to espouse the doctrine of unregulated fair field prices for natural gas, whether it be produced by a pipeline company or some other producer, large or small."

Meanwhile, an effort to work out more acceptable regulatory procedures and methods was seen as a promising approach to making things more "livable" for the producer.

In one of his first policy statements as incoming INGAA president, Clark said:

"I expect to appoint two policy committees—one to work closely with the pipeline division, the other to work closely with the producers' committee.

"Their functions will be to study these regulatory problems and to make constructive suggestions for appropriate changes in regulatory practices and procedure.

"I do not suggest that we abandon for one moment our contention that legislation is needed to correct the harmful effects of certain Supreme Court decisions.

"I do deplore the fact that we are not doing enough to mitigate these effects through suggested changes in regulatory practice within the framework of the Natural Gas Act."

It would be the job of the policy committee working with the producers' committee to find "some practical way of lessening the confusion" that exists in producer regulation.

The same approach apparently will be used to try to solve another problem that is worrying the pipeliners—the retention of the 6% earnings rate in the face of inflation.

One of the tasks facing the new policy committee working with the pipeline division of INGAA would be to come up with suggestions on how FPC can make the earnings rate more flexible.

The fixed-rate hazard was emphasized by Hedrick in a late insertion in his talk to the association.

"With many factors indicating that a trend toward higher debt cost will continue, a rate of return substantially higher than the 6% currently allowed by FPC will be required if any inducement is to be provided for the investor in common stocks of natural gas pipeline companies," Hedrick asserted.

One transmission company president underscored the need for a higher rate of return by pointing out that investors seem to be turning toward common stock as a "hedge against inflation." "We are able, every day, to go out and buy back our bonds at a discount," he added.

Henry R. Domers, FPC executive director, told the association that the federal agency "is not wedded to any fixed rate of return."

"I am sure," Domers said, "that the commission would consider a rate of return commensurate with an individual company's requirements."

Domers also told the group that FPC hopes to be able to whittle the pile of pending gas cases down to an "acceptable" level by 1961. The agency was swamped with certificate applications when producers were brought under FPC control.

An oil company attorney warned against the submission of price or cost information in certificate or rate cases.

Taking part in a panel discussion, William J. Merrill, Humble Oil & Refining Co., said such information should not be volunteered in certificate applications "because there is the danger that you may invite upon yourself a burden of proof which appears at present to rest upon your opponents."

"In submitting such information," Merrill added, "there is the danger that you may go contrary to what your judgment tells you is sound regulation and set a precedent for the determination of costs that will redound to your detriment in a rate hearing where all of your rates are involved."

Hancock, Signal See Merger Benefits

The planned merger of Hancock Oil Co. and Signal Oil & Gas Co.—announced late last week—is based on the theory that a combination of two aggressive firms can accomplish more than either could separately.

Samuel B. Mosher, Signal's board chairman, put it this way:

"There can be no doubt that expansion and consolidation of the proven dynamic growth patterns of the two companies under one aggressive management team will make possible achievement of even greater goals."

Both Signal and Hancock had small beginnings in neighboring California towns, Signal Hill and Long Beach, about 35 years ago. They have, in effect, grown up together.

The merger will not become official until it is approved by stockholders in meetings planned before the year's end. But no difficulty is expected because stock in both companies is closely held.

Merger will be on the basis of one share of Signal common stock for each of the outstanding Hancock common shares.

Hancock's stock is held primarily by its president, John W. Hancock, and by Virginia Reid Moore and Charles Reid Gaylord, relatives of the late Will J. Reid, one of Hancock's founders and its first president.

Mosher is the principal stockholder in Signal.

The Signal-Hancock merger has been rumored for years. Speculation picked up after Hancock's Signal Hill refinery was swept by fire in May.

At one point, Standard Oil Co. (N. J.) moved into the picture, negotiating to purchase Hancock, but these talks broke off in June.

Hancock and Signal already are partners in many ventures. They are joint owners of offshore leases at Huntington Beach, Calif., and each has a 28½% interest in Long Beach Oil Development Co.

Together, they own 50% of a Lake Maracaibo (Venezuela) concession.

They also own identical oil interests in the Iranian Consortium and in the Kuwait-Saudi Arabia Neutral Zone.

On the marketing side, the merger would give Signal strength in the Los Angeles area, where it does not now have stations. Hancock owns or controls some 425 branded stations in southern and central California. (These stations will continue to sell under the Hancock brand after the merger.)

Signal now markets in central and northern California, Arizona, Nevada, and Oregon—primarily under the Regal brand name.

In refining, the merger is expected to speed plans for the rebuilding of Hancock's 20,000 b/d plant at Signal Hill.

A definite decision has been made to rebuild the refinery, and engineering studies are under way. Construction, however, has not begun yet.

Asphalt Suppliers Face Problems

Asphalt suppliers, with one recent victory on imports, now are heading for other battles, hoping to eliminate two pressing problems.

The battle just won was for the exemption to be granted in the proposed import controls on asphaltic crudes processed in U.S. plants.

The plan recommended by Matthew V. Carson, the imports administrator, would permit asphaltic crude importers to exclude part of such crudes from their over-all quotas, based on the actual yield of asphalt from the imported crude.

The most pressing problem suppliers are being urged to attack now is one of long standing—the competition from the cement industry for highway building.

J. W. Buchanan, president of the Asphalt Institute, said last week at the Atlantic City (N. J.) meeting of the National Petroleum Assn. that unless all suppliers join in the fight, a "great majority of the new interstate system of roads will be paved with concrete at greater cost [than asphalt]."

Higher spending for new roads by the federal and state governments could create the danger of higher gasoline taxes, with a further depressing effect on gasoline sales, Buchanan warned.

The other problem is an intra-industry one, concerning the lack of duty on imports of finished asphalt.

Finished asphalt is permitted to enter the U.S. duty-free, though there is a duty of 5¼¢ a bbl. on asphaltic crudes.

Some refiners charge that this gives an unfair advantage to those who process asphaltic crudes in Caribbean area refineries and import the finished material into the U.S.

The refiners who are urging a duty on finished asphalt imports cite recent import statistics to show the advantage held by companies with asphalt process facilities outside the U.S.

Imports of finished asphalt in 1957 jumped 92% over 1956, to 6.9-million bbl., while production of asphalt in U.S. refineries dropped 5.5%, to 85.6-million bbl.

Pipelines Plan More Automation

Pipeline companies plan to step up automated operations with increased applications of computers.

That's the finding of a survey of 48 crude and product pipelines conducted by a committee of the American Institute of Electrical Engineers.

The findings, reported at an Electrical Conference of the Petroleum Industry in Dallas this week (page 86), showed that the 48 companies surveyed now operate 186 unattended main-line stations.

In 22 of the pipeline systems, there are master control centers for supervisory control of multiple stations.

Two-thirds of the companies surveyed plan to use computers for recording operating data or control of operations.

E. B. Turner, of General Electric Co., Schenectady, N. Y., who presented the survey findings, said the significance of the survey is the "amount of use and contemplated use of computers, along with the greater use of data logging in supervisory control."

Apparently, pipelines would step up their automation if additional control equipment and instruments were developed.

Pipelines operators reported that some of the equipment needs in the field of automated operations include: solid-state analog-to-digital converters; inexpensive deviation detectors; inexpensive rate-of-change detectors; complete assemblies of protection and sequence control; variable-speed a.c. motors in the 700-hp. to 2,000-hp range; and a reliable gas turbine or free-piston engine (500 hp. to 1,000 hp.) with an efficiency of 25% or better.

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What's New / IN THE INDUSTRY

Two rivals seeking to export Canadian gas to the U.S. West Coast may be asked to get together on a single line. This was hinted by the Alberta Oil & Gas Conservation Board last week when it ordered Alberta & Southern Gas Co. and Westcoast Transmission Co. to revise their applications.

The Conservation Board said the current requests of the two would exceed Alberta's exportable surplus. It gave each until Dec. 31 to file amended applications.

•

Frederick W. Richmond, a New York industrialist, has bought a major interest in Houston Oil Field Material Co. He plans to take an active role in the firm, and has been named chairman of the board. George O'Leary, a founder of the 30-year-old oilfield supply and service company, will continue as president. Joseph Lawrence, who has been with Homco 23 years, has been appointed executive vice-president and will be chairman of a newly created management committee.

•

American Independent Oil Co. has finally settled on a new president—D. C. Dunaway. The selection of the former president of Standard Oil Co. (Argentina) ends a five-month search to find a man satisfactory to the two opposing factions of Aminoil stockholders.

Last April, in an out-of-court settlement, stockholders agreed to put control of the firm in the hands of a seven-man committee. This committee was to be composed of three men from each of the two factions and a "neutral" president.

•

A single suit may be used to test the Louisiana gas tax. If so, this would make it unnecessary for each producer to pay the tax under protest and sue to recover payment. The state is expected to agree to this approach.

•

A simple, quick test has been developed to help determine how fuel oil will behave in service after a long period in storage. A. C. Nixon, Shell Development Co., described it this week at a meeting of the American Chemical Society. It is based on an Air Force method of measuring the filter-clogging tendencies of jet fuels by testing a sample in a hypodermic syringe.

•

Gas may be produced from oil shale at a cost as little as 30¢ per thousand cu. ft. That is the opinion of E. B. Schultz, Jr., and H. R. Linden, of the Institute of Gas Technology, Chicago. In a paper presented this week before the American Chemical Society, they said this could be done by using the one-step hydrogasification method for converting oil shale into high-quality fuel gas, and that it would be more efficient than making oil from the shale.

•

The expected announcement that Kerryn King would be chairman of the API's Committee on Public Affairs was made last week. King, a vice-president of The Texas Co., succeeds Thomas W. Phelps, who resigned.

The new CPA, which on Aug. 31 assumed the combined functions of the old Oil Information Committee and the American Petroleum Industries Committee, is now in the process of getting squared away.

INSIDE *Slant*

PROBLEMS NEEDING STUDY

Soaring material costs and wages at home largely are responsible for the increased activity of U.S. oil companies overseas.

A good example of this was unfolded by M. J. Rathbone, president of Jersey Standard, at last week's meeting of the National Petroleum Assn.

He said that in 1952 there were 72 U.S. oil companies carrying out exploration and producing operations in 51 countries abroad. Last year, these had increased to 150 companies, with operations in 73 different countries.

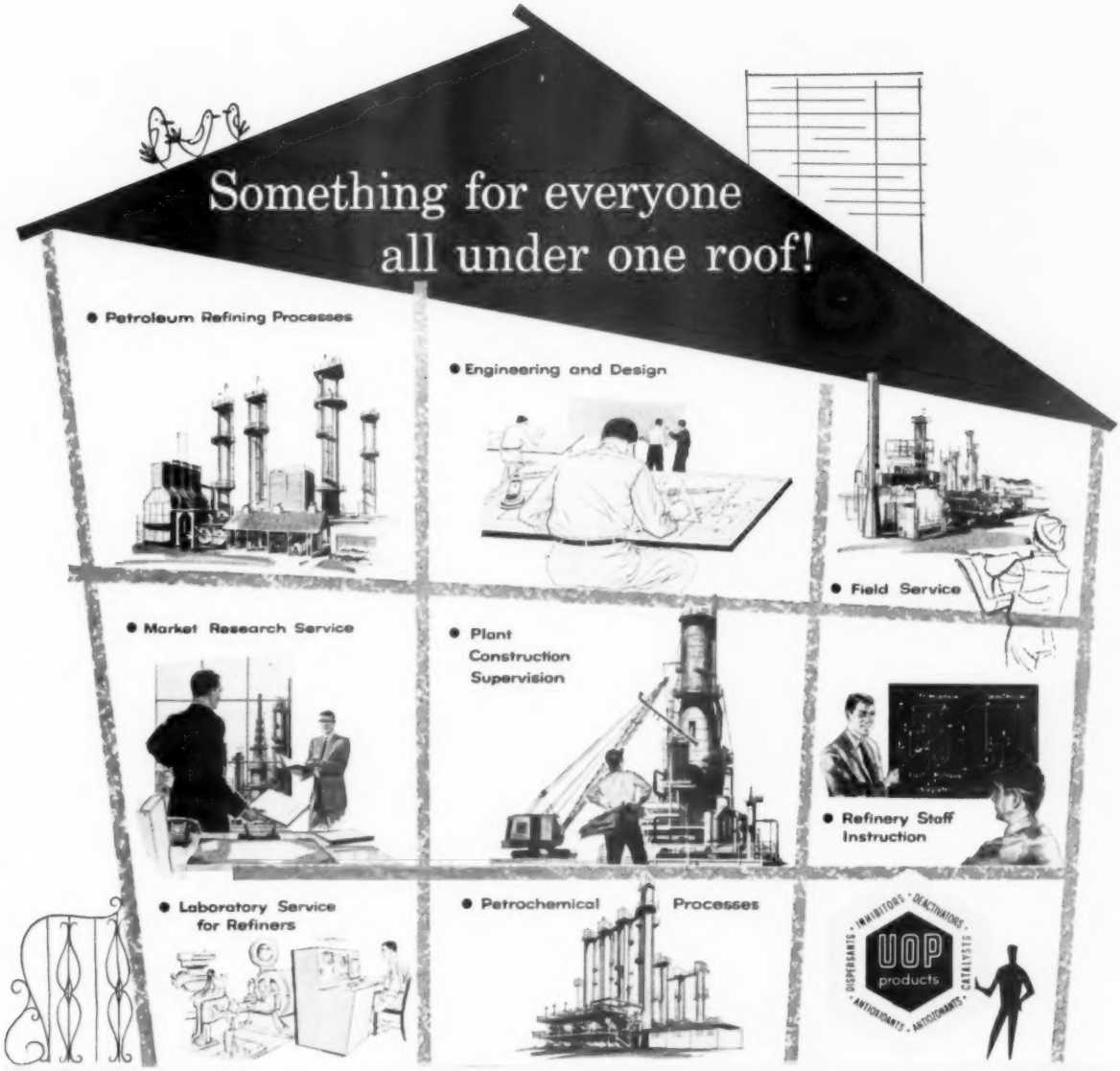
Rathbone also had another reason for the increased foreign activity. This was that foreign nations, needing more revenue and increased living standards, are all seeking to develop their petroleum resources as a basis for trade with other foreign countries.

Taking the point a step further, Rathbone said:

"One major effect of increased overseas exploration and producing effort has been to increase producing capacity greatly in many areas.

"Couple this with the recent slowdown in the growth rate of demand for oil, and real problems begin to emerge—problems that deserve our most serious attention—problems created by changing conditions."

LeRoy Menzing
EDITOR



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Looking Ahead in Washington

McGraw-Hill
Washington
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September 19, 1958

The Administration is considering an increased federal gasoline tax. Budget director Maurice H. Stans is looking for a way to pump an extra $1-billion a year into the special trust fund that finances federal-aid highways. Since the highway fund gets its money from user taxes—on gasoline, tires, etc.—gasoline becomes a prime target for more taxation. The Administration doesn't want to tap general revenues—which come from corporation taxes, income taxes, etc.—because a $12-billion deficit is expected in this category by fiscal 1960. Although the federal gasoline tax was boosted two years ago (from 2¢ to 3¢), to help foot the bill for the huge highway program, the government appears ready to tap the same source again—and many states may follow suit.

Such a tax boost could be as much as 2¢ per gal. although there is talk of 1¢ a gal., too. Some decision on the gasoline tax should come within the next two months.

•

Oct. 13 is the deadline for comments on the new oil imports plan. Matthew V. Carson, imports administrator, stresses that the plan is "not cut-and-dried." The Administration, he says, "really wants to see if there are any inherent bugs in the plan which might make it impractical." Indications are that Carson will get plenty of reaction to his offer. Comments should be addressed: Administrator, Voluntary Oil Import Program, Dept. of the Interior, Washington 25, D.C.

•

Eastern States Petroleum & Chemical Corp. and Delta Refining Corp. are currently considered the only imports "noncompliers," according to Carson. Several other companies are technically not in compliance for September, because of scheduling problems, but are expected to be back on the approved list by next month.

•

The government's crude oil availability study won't be ready until next year. Originally planned for completion by December, the 20-year forecast on domestic availability now isn't expected to be finished until mid-February or later. With the Bureau of Mines throwing extra field personnel into the data-collection problem, government officials expect one of the best crude oil studies ever compiled. The study was requested by the Office of Civil & Defense Mobilization.

•

Oil import restrictions may bring on early competition from nuclear energy in the U.S., a new report by the National Planning Assn. predicts. The report, prepared mainly by oil consultant Cornelius Dwyer, says that if imports are "unduly restricted," some parts of the U.S. might see nuclear energy competing with oil for the power-station market by the middle 1960s.

•

An examiner's decision in the Midwest gas case may come soon. Federal Power Commission Examiner Francis L. Hall has eliminated a major part of the case by ruling against the proposed expansion of Michigan Wisconsin Pipeline Co.

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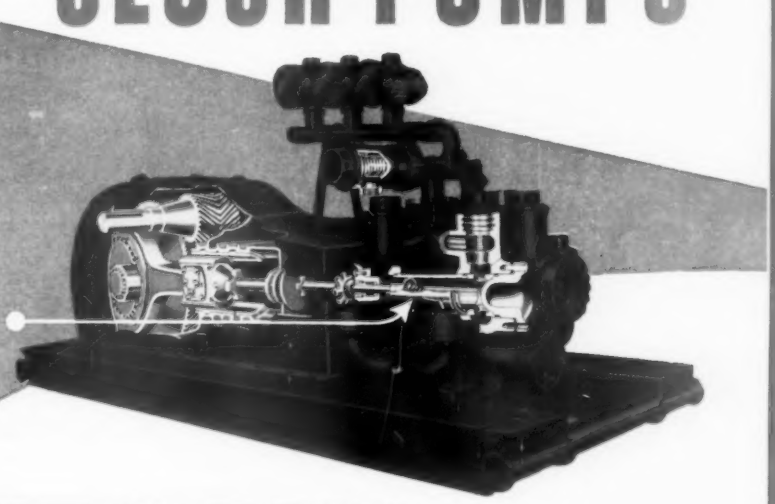

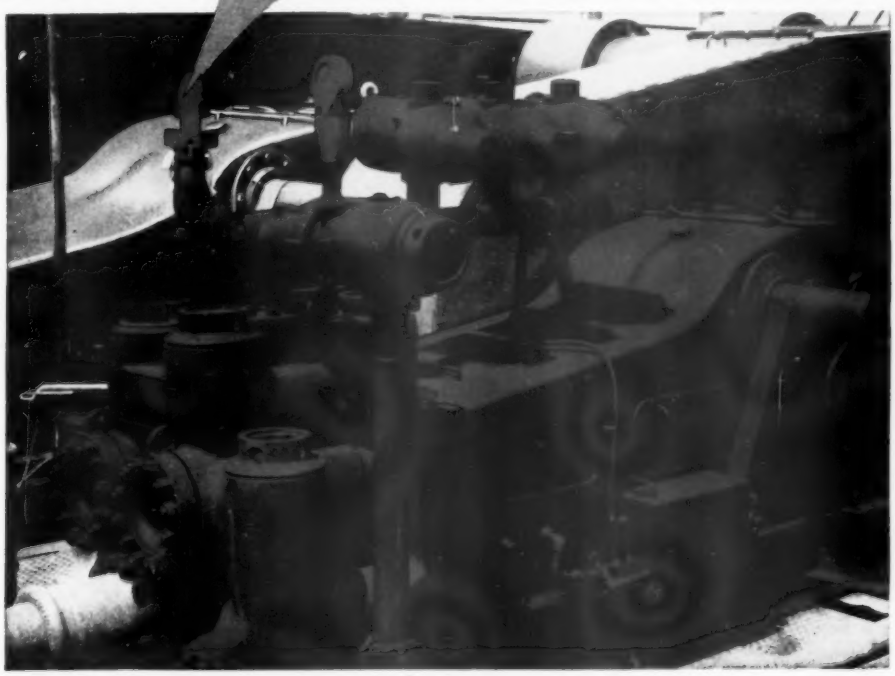

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PETROLEUM COMMENTS / By Wanda M. Jablonski

60-40 and 50-50—and Premature Obituaries

Saudi Arabia is putting finishing touches to its first petroleum law. It will provide for a 60-40 profit split for new concessions instead of the traditional 50-50.

The new law is slated to be promulgated as soon as a concession agreement along these lines is concluded with Pan American International, Indiana Standard's new entrant into the foreign field.

The Pan Am deal is now reported to be nearly finalized. Unless last minute snags develop, it should be ready for signing within a few weeks.

The proposed concession covers part of the inland "preferential area" near Arabian American Oil Co.'s discovery at Khurais. No cash bonus is involved.

* * * *

The new law, as now drafted, is almost identical in main terms to the proposed Pan Am contract. It contains several unusual features in addition to 60-40. A new concessionaire must form an "integrated" operation, including overseas transportation, refining, and marketing of its Saudi oil. The 60% tax is to apply not only to profits inside Saudi Arabia, but also to any profits on these activities outside of the country.

Also, a new concessionaire must start a local petrochemical industry, and must refine a substantial proportion of its crude in Saudi Arabia.

In short, the new draft law follows the pattern outlined in this column June 20.

* * * *

It's important to emphasize, however, that the Saudi Government has made it clear that this new 60-40 law will not be applied retroactively.

That is, it will not affect the three existing concession holders; their operations are governed by earlier agreements with the Saudi Government. And the terms of all three vary widely. Aramco, the largest, is operating under a straight 50-50 deal; Getty Oil has a 50-50 arrangement but with higher base royalties; and the Japanese recently secured rights under a 56-44 "integrated" profit split.

It remains to be seen whether any one besides Pan Am will choose to come in under the stiff new terms —especially since the area lined up by Pan Am is generally regarded as the last available attractive acreage in Saudi Arabia.

* * * *

Announcement of the 60-40 deal, however, will probably bring another round of hasty press comments about the "death of 50-50."

Eventually, the 50-50 principle in existing concessions may well evolve into something different. But its many obituaries in the current press are much too premature.

The new, higher bids indicate nothing more than what happens in the U.S. when oil is found on a lease: The value of the adjoining real estate shoots up. Bidders keen on acquiring adjoining leases have to offer something "extra."

The "extras" favored by the various oil producing nations with choice new acreage to offer have varied widely recently. Venezuela, in its recent concession offerings, asked for big cash bonuses rather than a modification of standard profit-sharing—on the "bird-in-hand-better-than-two-birds-in-bush" theory. It raked in a cool $700-million in hard cash before drilling even started.

Iran took a different tack: It turned down really big cash offers in favor of a gamble on an extra 50% participation in the operation—if oil is found. Saudi Arabia, in its Japanese and Pan Am negotiations, ignored both cash bonuses and direct participation, and gambled all on a higher percentage of profits from "integrated" operations.

* * * *

Despite press assumptions that these new deals have killed the 50-50 agreements, it is worth noting that, to date, not a single government has even suggested a change in its established basic contract terms.

The pressure that is being put on existing concessionaires is along a different line: for higher and higher export volumes (and relinquishment of extra acreage).

With spare oil productive capacity of unprecedented size in the world today, most governments are aware that their best road to increased oil revenues lies in encouraging bigger export volumes rather than in seeking a bigger share of present revenues.

And they can afford to experiment along new lines with newcomers only because of the sure return on their existing concessions.

For however profitable the new deals may look on paper, new production will not necessarily create new markets. Even if large oil reserves are discovered by the newcomers, that is only the first step.

The next question—and a big question in the present world surplus—will be whether new concessionaires can break into world markets on a big enough scale without slashing prices disastrously. Their profit margins may be squeezed between low sales prices on the one hand, and high unit production costs (because of low volumes) on the other.

Thus, a government's 60% or 75% take of a thin profit margin may well prove less than 50% of a big one.

As one Middle East wag put it, it will take time to determine "whether more of less, will prove more, or less, than less of more."

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Halbouty Is Bullish on Alaska's Future

"It is my confirmed opinion that Alaska will eventually become one of the most prolific oil and gas producing areas in the world." So says Michel T. Halbouty, independent operator, of Houston.

Halbouty, who also is a consulting geologist and petroleum engineer, gave this optimistic statement in a special report for PETROLEUM WEEK this week following his recent on-the-spot study of Alaska.

The Houston oil man, who controls 1¼-million acres of oil and gas leases in Alaska, made a three-week tour of the new state. He talked with government officials, bankers, and businessmen, and made ground and aerial surveys of his leases (in the Kenai Basin, Porcupine Basin, Koyukuk Cretaceous Basin, Nushagak Basin, and the Alaskan Peninsula, in the Port Moller area), and visited other promising areas in the vast state.

Halbouty's matter-of-fact conclusion is based on the observations and studies he has made of the geological conditions in the new state.

"After seeing many large structures and studying as much as possible of the geology of the basins," he says, "I am convinced that a great chapter of the American oil industry will be written in Alaska.

"The territory has a combination of huge and extensive basins in width and depth, favorable surface structures that are as large as any in the world, encouraging geophysical surveys in the lowland areas, where outcroppings of the formations are not present.

"There also is the existence of numerous oil seeps throughout the state, the discovery of large reserves of oil and gas in the Arctic Slope, and the recent discovery of an apparently substantial oil field in the southern region on the Kenai Peninsula.

"Alaska has all the textbook requisites for oil and gas except men, materials, and determination, which, I am sure, will soon be forthcoming."

The Houston independent says there are many areas in Alaska that have promise of being oil-productive, but nine appear to have the most potential.

Halbouty says these nine regions—arranged from north to south, and not necessarily in order of importance—are:

(1) All of northern Alaska, north of the Brooks Range.
(2) The Porcupine Region.

MAJOR AREAS of potential oil and gas play in Alaska are shown on this map, prepared especially for Petroleum Week by Michel T. Halbouty, Houston independent.

(3) The Koyukuk Region.
(4) The Bethel Basin.
(5) The Nushagak Basin.
(6) The Copper River Basin.
(7) The Cook Inlet Basin (sometimes referred to as the Kenai Region), which includes the Susitna and Matanuska lowlands.
(8) The Alaskan Peninsula Region.
(9) The St. Elias-Yakutat Coastal Region.

To evaluate Alaska's petroleum possibilities, Halbouty adds, the state should be divided into three major geologic-physiographic regions: (1) the northern; (2) the central; and (3) the southern. The northern region includes the Brooks Range and all the region north of it to the Arctic Ocean.

The land area involved in the northern region is approximately 125,000 sq. mi., although the area north of the drainage divide of Brooks Range constitutes about 76,000 sq. mi.

The Navy, through the Office of Naval Petroleum & Oil Shale Reserves, has conducted an exploration program for oil in this region—on its Naval Petroleum Reserve No. 4, consisting of about 37,000 sq. mi., an area as large as Indiana.

This exploration began in 1944 and lasted ten years, resulting in the discovery of three oil fields—Umiat, Simpson, and Fish Creek—and six gas fields—Gubik, Barrow, Wolf Creek, Oumalik, Meade, and Square Lake. Gubig and Barrow are the largest of these.

Discovery of these fields involved 36 exploratory tests (a total of 135,677 ft. of hole) and 44 core tests (a total of 33,873 ft.) in the exploration of 18 structures. The tests ranged in depth from 373 ft. to 11,872 ft. The core tests, drilled for structural, stratigraphic, and engineering information, ranged in depth from 115 ft. to 2,505 ft. These wells tested mostly the upper and lower Cretaceous sections, although the deep test penetrated the Devonian.

"The operations conducted by the Navy Dept. on its Pet 4 Reserve," says Halbouty, "will prove to be invaluable to operators who may in the future

further explore and drill in the Arctic Slope.

"Since oil and gas have been proven to exist in sizable reserves in Naval Pet 4, there is every reason to believe that, with more geologic mapping and geophysical work, more fields will be discovered with reserves of such magnitude as to warrant the building of transportation facilities to move the oil and gas to available markets.

"One fact is certain: The Naval operations definitely proved that exploration and drilling in this Arctic Region can be efficiently and successfully conducted throughout the entire year, irrespective of season."

(During World War II, Halbouty served as Chief of the Petroleum Production Section, Planning Division, Army-Navy Petroleum Board. He entered service as a captain and rose to lieutenant-colonel.)

The central geographic-physiographic region of Alaska covers approximately 275,000 sq. mi., extending from the Brooks Range on the north to as far south as the Alaska Range.

This area reaches from the Canadian border on the east to the Bering Sea on the west.

The Books Range forms a huge barrier across northern Alaska, separating the Alaskan Arctic from the more temperate and inhabited central region to the south.

The great Yukon River, with its broad flood plains and basin, flows through this region.

The areas that have the most promise of being productive in this vast space, according to Halbouty, are (1) the Porcupine Region, (2) the Koyukuk Region, which includes the Norton Basin, (3) the Bethel Basin, and (4) the Nushagak Basin.

"It is interesting to note that in this vast region of central Alaska," says Halbouty, "which is larger than the entire state of Texas, only six holes are known to have been drilled for the purpose of finding oil and gas."

"The deepest of these wells was 350 ft. and only penetrated into the Quaternary deposits.

"Imagine what the results would have been, or could be in the future, if only a small percent of the wells drilled in Texas could have been, or could be, drilled in this region!"

Halbouty adds that very little geologic information is available from the Bethel and Nushagak Basins because these areas are covered by Quaternary deposits. He says it will require extensive geophysical work and core tests to obtain any data on the structures and stratigraphy that are hidden underneath the Quaternary.

The Koyukuk and Porcupine regions, Halbouty continues, contain sediments which are "most interesting and which definitely warrant exploration and drilling."

For example, says Halbouty, the Porcupine Region has an unusually complete Palcozoic section, with sufficient outcroppings to give considerable information on the stratigraphy.

The formations that are known to underlie this central region and the large anticlinal structures that are so evident in the Koyukuk and Porcupine areas, he says, certainly would indicate that oil and gas possibilities are indeed excellent.

"It is most noteworthy," he adds, "that equipment can now be trucked from any part of the United States and placed on the ground in the heart of the Porcupine Region by following the Alcan Highway to Circle, then the DEW-Line road into the region."

The third and, at present, the most active geologic-physiographic region of Alaska is the southern, according to Halbouty.

This region includes (1) the Copper River Basin, (1) the Cook Inlet Basin, (3) the Alaskan Peninsula Region, and (4) the St. Elias-Yakutat Coastal Region.

Halbouty says there "is no question" that Richfield Oil Corp.'s No. 1 Swanson River Unit discovery on the Kenai Peninsula "is of utmost significance, if for no other reason than that it triggered an intense interest in all of Alaska and is responsible for the increased activity in leasing and exploration with geophysical and geological crews and surveys."

There are numerous oil seeps in the southern region, in widely scattered localities. These seeps were reported as early as 1853, and actual drilling was conducted near the oil seeps in the Katalla district in 1901. (The Katalla district is located in the extreme western end of the St. Elias-Yakutat Coastal Region.)

From 1902 to 1933, the Katalla field produced 154,000 bbl. of oil from shallow wells from fractured shale in the Katalla formation of mid-Tertiary age.

"Yet, with all of the known requisites available for good oil 'hunting,' it is somewhat amazing to note that the first seismograph used in southern Alaska was in 1954," Halbouty notes.

The southern area is presently the most interesting to operating companies because of the accessibility of the most promising of the basins, and the fact that the sedimentary rocks from the Ordovician through the entire younger geologic systems are present in the region, according to Halbouty.

MICHEL T. HALBOUTY, Houston independent, says Alaska is destined to be a "great petroleum empire."

"It was important to the oil industry to know that Richfield Oil Corp.'s discovery is in the Tertiary," says Halbouty, "which indicates that the Cook Inlet-Kenai area is a basin of consequential thickness.

"The edges of the basin are against Mesozoic and Paleozoic rocks, which would indicate that Cenozoic, Mesozoic, and Paleozoic reservoirs are present in the region—the thicknesses of each still to be determined by actual drilling.

"The Susitna and Matanuska lowlands areas offer exellent possibilities for subsurface anticlinal structures as well as stratigraphic traps."

A complete Tertiary section may be seen on the flanks of the St. Elias and Chugach Mountains, and beneath the Coastal lands along the Gulf of Alaska, Halbouty says.

This Coastal region warrants further exploration and drilling, he says. And because of the predominantly marine Tertiary section that underlies the Coastal plains, it is believed that production will be found in those areas where geological and geophysical surveys indicate the presence of appropriate structures, according to Halbouty.

"In fact," he adds, "the entire southern region of Alaska is considered to have exceedingly excellent possibilities for the existence of large oil fields, with reserves that may equal the best fields in the world.

"If only a quarter of the amount of time, effort, and money that was expended in the Middle East were spent in Alaska, the territory would now be a most prolific producer of oil

and gas, with refineries and pipelines, all owned and operated by the American oil industry under our own laws—stable and without fear of losing the reserves and facilities to some foreign power or sheikdom.

"Irrespective of what has happened in the past, the oil industry won't let Alaska down as the state reaches out for its destiny as a great petroleum empire."

Halbouty has backed up his optimism of Alaska's oil and gas potential by forming Halbouty Alaska Oil Co., to be known as Halasko.

Capitalized at $1-million, the corporation will begin its first operations in the early spring, in either the Kenai or Porcupine Basins (PW—Sep.5'58, p30).

Halbouty's optimism on Alaska's oil potential takes on added significance because of his past successes in discovering oil and gas fields, particularly along the Texas-Louisiana Gulf Coast.

His first discovery was the Ashland oil field, in Natchitoches Parish, La., in January, 1946. Since then, he has discovered 32 more new fields or extensions.

He is a graduate of Texas A. & M. college, with a Bachelor of Science degree and a Master's degree for his work in geology and petroleum engineering.

North Dakota Deep Drilling at High

The first producing formation found in North Dakota—the deep, Devonian horizon—is getting more and more attention, after having been neglected for years.

The trend in development in the North Dakota portion of the Williston Basin has been to complete wells in the shallower Mississippian formation, found at about 6,000 ft. to 9,000 ft. in the western part of the state. The state still is basically a Madison (Mississippian) producer.

But the concentration on this formation is loosening up as more deep tests are drilled, and the pre-Mississippian, below 10,000 ft., gets a bigger share of drilling money and more attention.

Beaver Lodge—the first field discovered in North Dakota—is the scene for much of the increased deep drilling.

There are now 12 Devonian producers in the field, and two deep tests are being drilled. Less than a year ago, the deep formations were still a puzzle, and still essentially unevaluated (PW—Nov.1'57,p23).

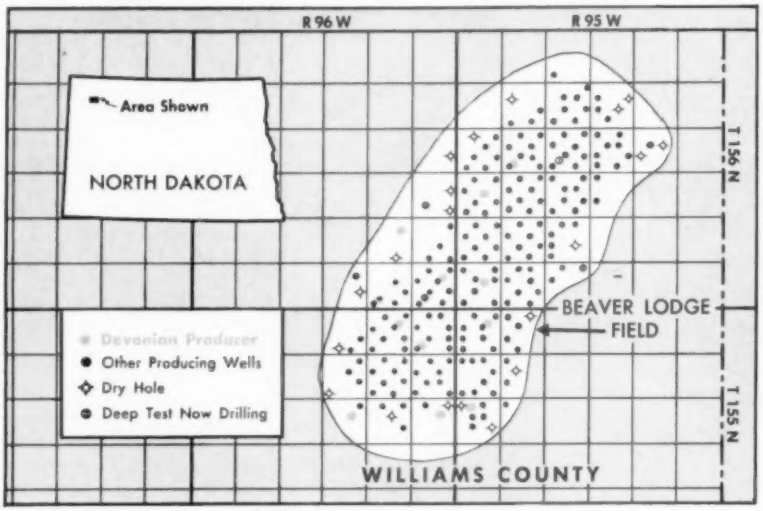
A few deep tests had been drilled in the field, but the bulk of production came from the Madison.

Currently being drilled in the field are Amerada Petroleum Corp.'s No. 1-A Iverson and No. 1 Anton Kvaam.

Iverson is no new name to the field, or to the history of oil in North Dakota. Amerada found the state's first commercial oil production at the No. 1 Clarence Iverson in the spring of 1951. The well first found oil in the Devonian, and was completed in that formation in the summer of 1951. But it was recompleted in the shallower Madison late that fall.

Cumulative production from the Devonian at Beaver Lodge has more than tripled since the first of this year.

As of Jan. 1 the field had seven Devonian producers, and cumulative production totaled 41,863 bbl. By the end of June (the latest date for which figures are available), cumulative production had reached 153,945 bbl. So far this year, five Devonian producers have been added to the field.



The deep drilling outlook is improved by the fact that only three deep holes in the field have been dry. All of these were drilled by Amerada, the major leaseholder in the field.

Devonian drilling is on a 160-acre spacing pattern, assigned earlier this year by the state Industrial Commission. The Madison is on 80-acre spacing.

Oil from the Devonian is 42- or 43-gravity, and will congeal on the surface on all but the warmest days because of its heavy paraffin content. Reservoir pressure is 4,900 psi., at a temperature of 250F. Despite poor permeabilities, recoveries have been good.

Pay zones have been excellent. In one well, Amerada found five different sections of the Devonian with a total thickness of more than 350 ft.

Oil from the Devonian is shipped by Service Pipe Line Co. from Tioga to the refinery of Standard Oil Co. (Ind.) at Mandan, N. D. Recently, Devonian crude throughput was boosted to 700 b/d at the refinery.

Another deep formation getting attention is the Silurian, below the Devonian.

The Silurian is primarily a gas-condensate producer in this area. Several wells have been completed in this formation, but so far they have been shut in immediately, because gas would have been wasted without a cycling plant.

Eventually a plant will be built. But, according to Amerada officials, the decision on how large the plant will be is "about two years off."

Silurian production, developed on 320-acre spacing, now covers eight sections in the field, and reserves have been estimated in excess of 200-million bbl. of condensate. To date, cumulative production, on an experimental basis, is only 12,618 bbl. of 52.7-gravity condensate.

"We have to carry Silurian development pretty far before getting production," says an Amerada official. "We will shut in the lower formation until we know precisely what kind of plant needs to be put in."

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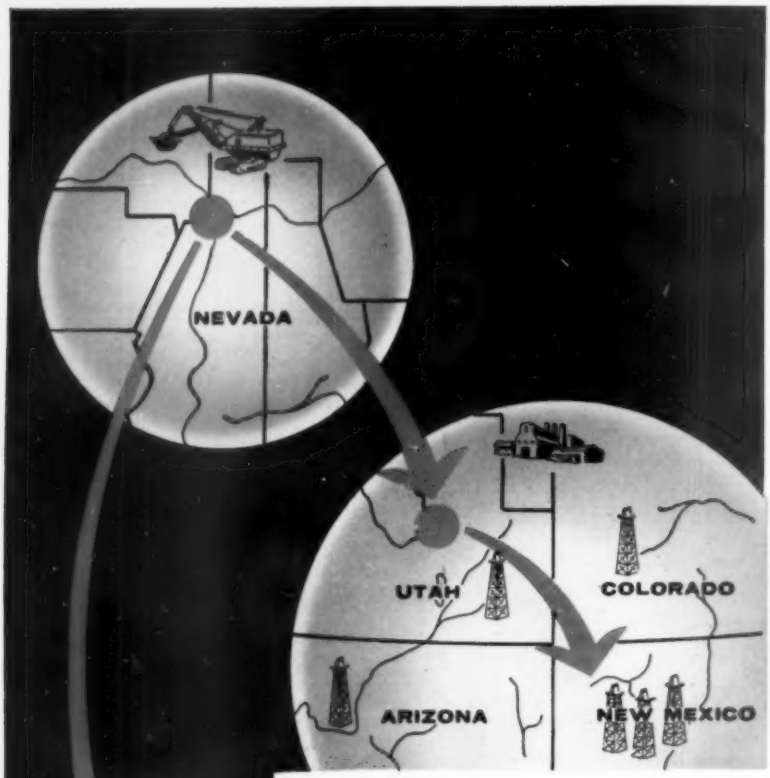

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Fewer Blowouts Is Course Aim

The first of an industry-supported series of courses to train drilling personnel in the prevention and control of blowouts will be held next week in Lafayette, La.

The course is being offered by the Petroleum Extension Service of the University of Texas (Petex).

An instructor's outline, a comprehensive training manual, and two films were prepared for the course under the cosponsorship of the American Assn. of Oilwell Drilling Contractors and the American Petroleum Institute.

The instruction will be offered initially to toolpushers and other drilling supervisory personnel.

The Lafayette course will be followed by another in Odessa, Tex., in October. Plans are also being completed to present the course in the Rocky Mountain and Williston Basin areas during the winter.

Tentative arrangements call for two-day seminars for toolpushers and supervisors to be held in Farmington, N.M., Denver, Colo., Casper and Glendive, Wyo., Billings, Mont., and Williston, N.D. Each class will be limited to about 20 enrollees.

Petex staff members will conduct the 12-hour seminars, assisted by selected panels of local drilling engineers and other specialists. Instruction will be a combination of lectures, demonstrations, conferences, and panel discussions.

Frank J. Whitley, BBM Drilling Co., Houston, was chairman of the 11-man advisory committee that worked on the course for more than a year. He will review the program and show the films at a general session of AAODC's 18th annual meeting, in Dallas, Oct. 1-3.

Separate programs will be carried out abroad.

The present program has included training-aid adaptation for South American use.

In addition, the education effort is expected to be conducted in France, Germany, Iran, and possibly other areas.

The program also has drawn the support of the Canadian Petroleum Assn. and the Canadian Assn. of Oilwell Drilling Contractors.

As in the U.S., these programs will lean hard on the human factor involved in blowouts. The course sponsors hope the education will reduce the high percentage of blowouts now blamed on human error.

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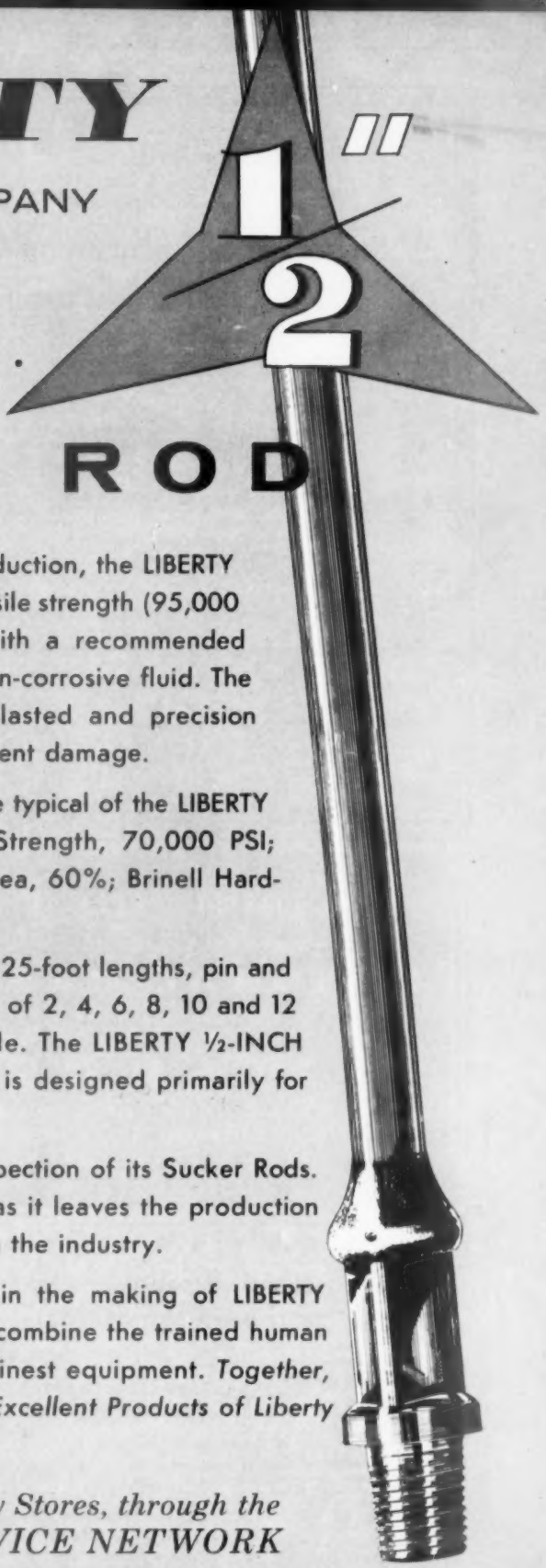

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Canadian Well Control Tested

An electronic well control system—one of the first to wear a "Made in Canada" label—is being tested by Home Oil Co., Ltd., in Alberta's Turner Valley field.

The new programmer, developed by Harms-Schwartz Engineering, Ltd., Calgary, may "drastically cut oil production costs and change production techniques in Canada," says a Home Oil representative. The equipment was developed at the request of Home Oil.

"Though automatic devices are common in the U.S.," says a Home official, "it's important for Canada to develop its own, so that parts and service are more easily obtainable."

He adds: "This is the first Canadian development of its kind, and this is important. When something goes wrong, we must get instantaneous service."

The electronic programmer will regulate production at the field from a point several miles away.

The programmer, which serves 12 wells, consists of an aluminum drum, 1 ft. in diameter and 2 ft. long. As it revolves, it trips mercury switches on and off by a series of knobs on the drum. These switches open and close solenoid valves on wells in the field.

The wells produce by gas-lift. Previously, gas injection had been regulated by 24-hour clocks. Because of weather and corrosion, the clocks could not be kept synchronized except for short periods. Some wells would get too much gas, others not enough.

With the new system, production from the unit has risen 20 b/d, and the company is saving $25 per day in operating costs. At that rate, Home says, the installation will pay for itself in four months. The programmer and the necessary power lines cost about $9,000 to install.

The company has now ordered an electronic brain, to operate a whole series of automatic devices in the Turner Valley field.

By use of a punched tape, the brain can schedule 12 different operations every five minutes on a 30-day basis.

In addition to turning wells on and off, the tape can call for tests and record the results. As tanks are filled, it can direct oil from batteries to pipelines. It can continuously audit its own functions and exert far stricter control over operations far more accurately than can be done by human hands, says a Home official.

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CREWMEN pull pipe on the discovery, which was drilled to 12,677 ft.

LOCATION of the strike, miles from production, is the Berland River area.

A new wildcat gas discovery in the Alberta foothills area by British American Oil Co., Ltd., and Shell Oil Co. of Canada, Ltd., is being hailed as the year's most significant strike in Canada.

The discovery is the No. 8-4-A Berland River, section 4-59-25w5, about 160 mi. northwest of Edmonton.

Claims for the new gas strike are supported by some impressive facts:

- It is Canada's deepest productive Devonian D-3 reef, and has the thickest gas pay (551 ft.) of any reef discovered in Canada to date.
- On recent production tests, the well flowed 44.8-million cu. ft. of gas per day through 1-in. choke, and 12.9-million cu. ft. of gas per day through ⅜-in. choke.
- Flowing wellhead pressure was 2,491 psi. on 1-in. choke, and 3,936 psi. on ⅜-in. choke.

The D-3 reef was encountered at 12,014 ft. The well was drilled to 12,677 ft. and plugged back to 12,465 ft. Casing was set at 12,008 ft.

The find is located on a 400,000-acre reservation block held jointly by British American and Shell. Follow-up drilling will be necessary to determine the extent of the reservoir.

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PERFORMANCE

Special savings are yours *every day* when you install a field-tested and performance-proven Parkersburg Pumping Unit on your well. Parkersburg units are built for dependable service and low-cost operation. This is a combination that cannot be beat anywhere.

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Division of Parkersburg-Aetna Corp.

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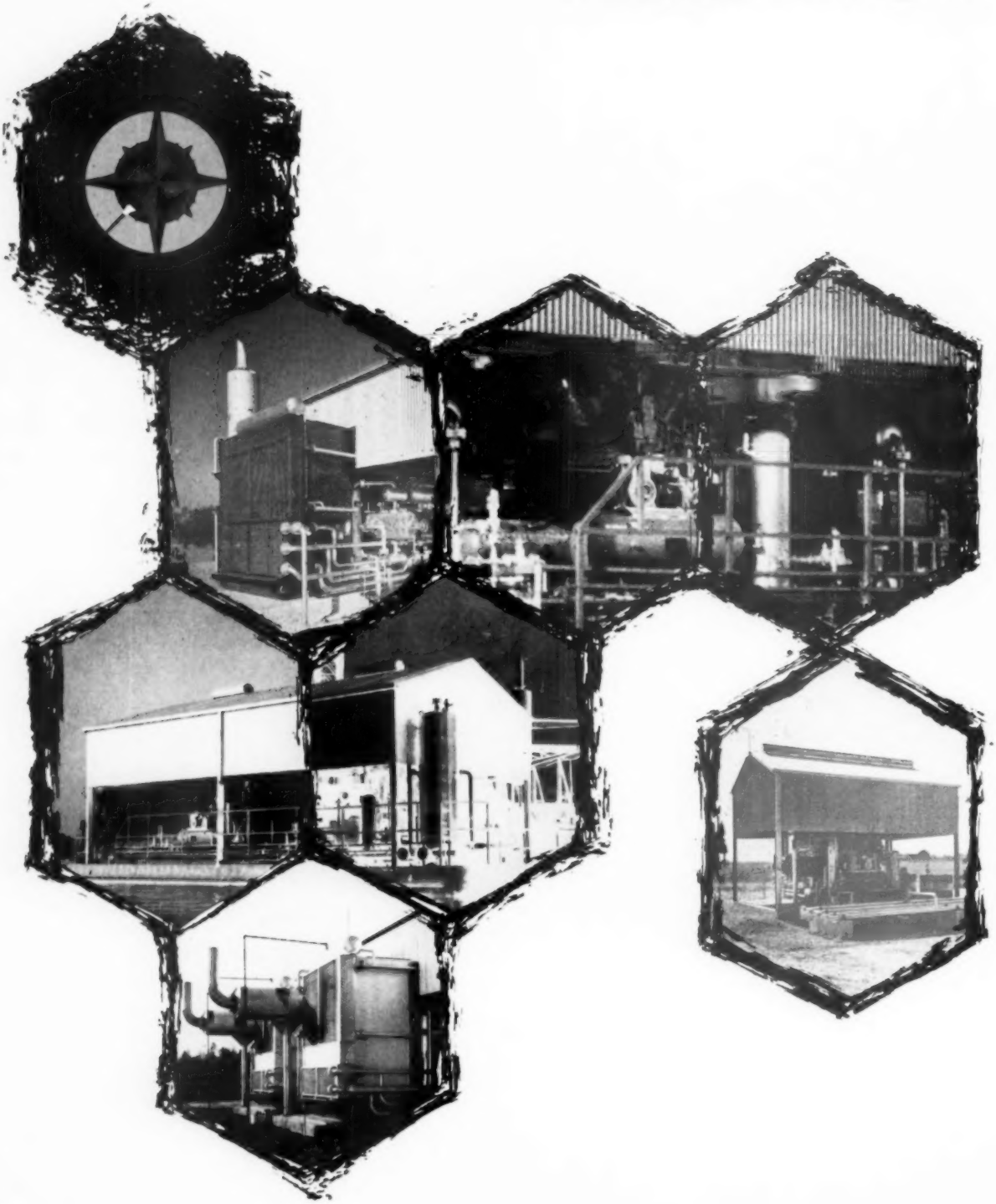

and Builds Packaged Compressor Compressor You Select

Now to the advantages of Southwest design and engineering you can add flexibility of choice by selecting your own make and type compressor in sizes of 100 to 880 hp. You have the sound advantages of proved Southwest engineering. There is no increase in your parts inventory. There is no training period to familiarize your personnel with a new make compressor. Yet, you can have the vastly improved and superior Southwest design for your packaged gas compressor.

Southwest Packaged Gas Compressor Plants installed in the field are now producing more than 100,000 horsepower—compressing more than 1½ billion CF/D—for field pressure boosting, main line gas pipe line pumping, secondary recovery, and other difficult applications.

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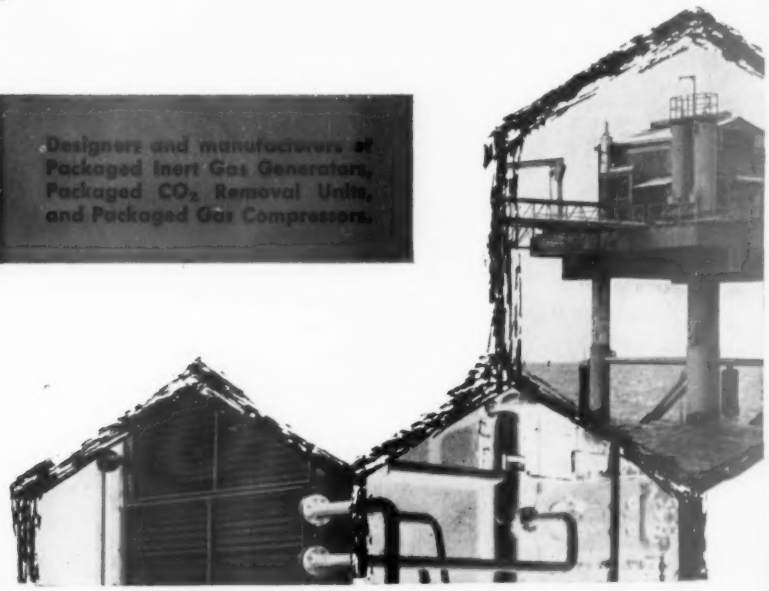
Designers and manufacturers of Packaged Inert Gas Generators, Packaged CO_2 Removal Units, and Packaged Gas Compressors.



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DIACEL LWL provides flexible cement retardation to fit your requirements. It allows you to place cement to extreme depths and at a wide range of temperature . . . gives you a low-water-loss slurry that helps prevent pipe sticking, flash setting and water damage to pay zone formations.

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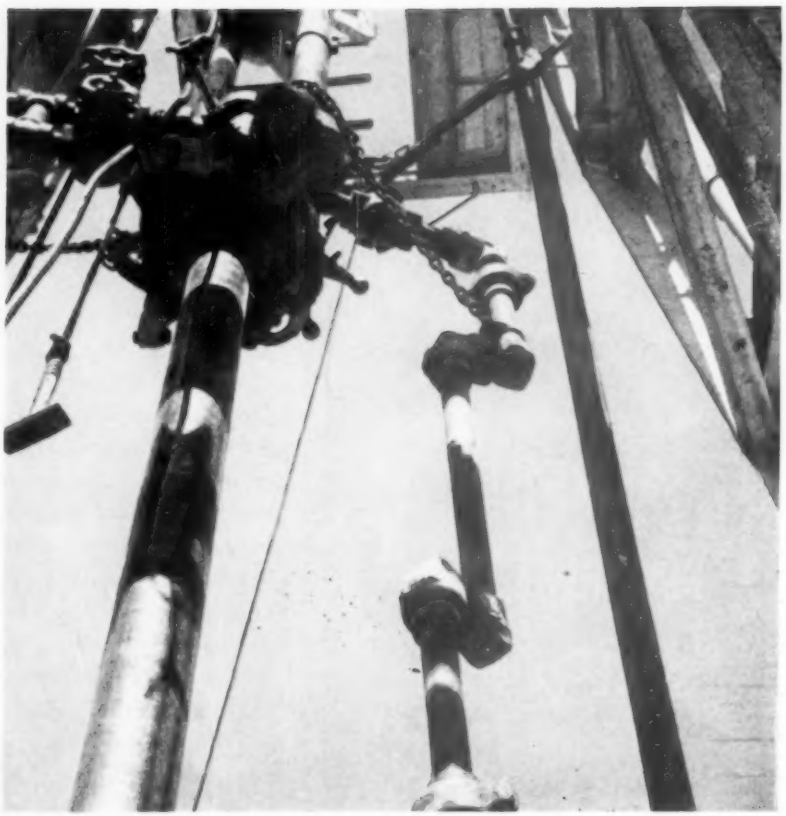

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DRILLING SPECIALTIES COMPANY

Bartlesville, Oklahoma

What's New / IN EXPLORATION, DRILLING, PRODUCTION

Alaskan Lease Sale Brings in $224,000

The first competitive bid sale of Alaskan leases has brought the Dept. of the Interior $224,000.

Bids were accepted for 26 tracts, totaling 16,000 acres, in the Gubik gas field of north-central Alaska.

In noncompetitive leasing in other areas of Alaska, Blackwell Oil & Gas Co., Crescent Petroleum Corp., Texas Natural Gasoline Co., Apache Oil Corp., and Western Hemisphere Petroleum Co. have acquired leases or options on about 906,000 acres. A major portion of the acreage is in the Koyukuk Basin area.

Blackwell will be temporary operator of the properties.

•

Rumania Is Exporting Rigs

A Rumanian-designed turbodrill rig, capable of drilling to about 10,000 ft., has become that country's leading oil-equipment export item.

The unit, designated the "4-LD-400-150," has been sold to a half dozen countries so far, according to a report published in the Bucharest German-language daily, Neuer Weg.

The report says the A-frame derrick is 141 ft. high and is made of steel pipe, which can be detached in three sections.

The unit is powered by four Diesel-type engines with a total of 1,450 hp. Pneumatic handling from a central panel is said to allow fast switch and working speeds.

An important feature, the report continues, is the clutch. This operates on the friction system and is run by compressed air.

Hydraulic turbine transmissions connect the engines to the power end. The transmission, built with pinion and helical gears, affords a peak rpm. rating of 275 at the turbine shaft.

•

Leasing News

High bid at the regular September sales of leases on Colorado state lands was $10.40 per acre.

F. Wallace Gage and Jack Thames, Inc., made the offer for tracts in Logan and Morgan Counties.

Total receipts amounted to $25,577 for 18,256 acres leased. Of 74 tracts offered, 42 drew bonus bids.

Tidelands Development Corp.'s leases on 144,749 acres of Alabama offshore property have been extended.

The company's present lease on the submerged lands ends in February, 1962. The new lease extends the terms five years. Tidelands paid 50¢ an acre plus a bonus for the extension.

The waters involved extend seaward 3 mi., and stretch from the Mississippi state line to a point just east of Dauphin Island in the Gulf of Mexico.

The first lease sale this year of Fort Peck Indian Reservation lands in Montana has been scheduled for Oct. 14.

A total of 34,000 acres will be offered at the sale, with some lands on the reservation, in the northeastern part of the state, plus tracts in Sheridan, Daniels, and Roosevelt Counties.

The United Pueblos Indian Agency will lease 33 tracts of tribal and allotted lands in Valencia County, N.M., on Oct. 2.

The offering includes approximately 20,040 acres. The sale will be held at agency headquarters at Albuquerque.

Three oil companies have turned back 2,580 acres of offshore leases to California, after spending $7.6-million on the property without finding oil.

In 1955, Monterey Oil Co., Humble Oil & Refining Co., and Seaboard Oil Co. leased the property, off Huntington Beach, Orange County, for a bonus bid of $4.6-million. Since then, more than $3-million has been poured into drilling operations on the tract.

The state Lands Commission accepted the return of the property.

•

The North Dakota Industrial Commission has approved temporary 160-acre spacing for the North Tioga field. It is the first time that a 160-acre pattern has been approved for the Madison formation on the Nesson anticline. Madison development has been on 80-acre spacing.

The North Tioga field covers about 25 sections in Burke, Divide, Williams, and Mountrail Counties.

The commission also gave the go-ahead to Amerada Petroleum Corp. and others to start a waterflood program in the Tioga-Madison unit.

This decision was protested by attorneys Dean Winkjer and Lee Fraase, who said, in effect, that Amerada had not fully informed land owners how the program would affect existing lease contracts.

The order permits the operators to start water injection through five wells.

•

Gulf Oil Corp., purchaser of all crude in the Citronelle field, has asked the Alabama Oil & Gas Board for permission to recomplete seven wells in the field as dual producers.

The company wants to recomplete the wells by using a single string of tubing and a wire-line-controlled valve. Gulf abandoned the practice of dually completing wells with two strings of tubing 16 months ago, claiming the completions were too costly.

•

Gas has started moving to consumers for the first time from Alberta's Many Island Lake field.

Developed production of the field is held jointly by Britalta Petroleums, Ltd., and Crescent Petroleum Corp.

Gas is being sold to Saskatchewan Power Corp., on a 20-year contract. Saskatchewan estimates its first-year requirements from the field at about 3-billion cu. ft.

•

Clark Brothers Co., one of the Dresser Industries, and Armstrong Siddeley Motors, Ltd., have signed an agreement whereby Clark-designed gas turbines will be manufactured in Great Britain.

The initial activity of the English firm will include the production of giant turbine units for oil and gas producers.

•

The U. S. Geological Survey has approved the largest federal unit in the history of Wyoming.

Carter Oil Co.'s Meridian Ridge unit, Lincoln and Sublette Counties,

contains 99,326 acres. The unit is in the western portion of the Green River Basin. Carter is drilling below 3,000 ft. at a scheduled 14,000-ft. wildcat on the block.

USGS has also approved Ohio Oil Co.'s Williams Park unit, Routt County, Colo., which contains 5,380 acres.

•

By the end of August, Rocky Mountain operators had drilled 2,951 holes, 60 more than in the same eight months of last year.

Of these, 1,356 were dry, compared with 1,460 dusters drilled up to the end of August, 1957.

Exploratory drilling is down, with 1,016 wildcats completed this year, and 1,226 in the same period of 1957. The 1958 discovery ratio of 13.3% is slightly ahead of last year's.

•

The Justice Dept. has received a high bid of $42,000 for an interest in Louisiana oil property seized from German owners during World War II.

The bid was submitted by John Franks, Shreveport, on the government's offer to sell one-third of the ⅞th's working interest in a 40-acre lease in Caddo Parish.

•

The Texas Railroad Commission has approved several waterflood projects in scattered parts of the state.

Projects approved are for the Doty (Bluff Creek) field, Jones County, West Central Texas; the T. O. Hendrick Estate lease, Shackleford County, West Central Texas; the Hood leases, Callahan County, Southwest Texas; and the W. T. Waggoner "C" lease, Wichita County, North Texas.

•

New Superior Oils of Canada, Ltd., reportedly will purchase all assets of Altex Oils, Ltd., on the basis of one share of New Superior for each seven and one-half shares of Altex.

•

The Arkansas Oil Gas Commission has denied the application of Phillips Petroleum Co. to commingle production from different sand lenses in the Snow Hill field, Ouachita County.

The application was opposed by Monsanto Chemical Co. and others. They argued that commingling of production from the Cotton Valley formation would permit migration of water, gas, and oil from one lens to another in the field's ten producing sands.

•

United Cuban Oil Co. has acquired 670 acres of land in Union County, Ark.

The tract has four producers. Another test is drilling below 4,700 ft.

•

Drilling Highlights

Utah—Superior Oil Co., Standard Oil Co. of California, and Argo Oil Corp. No. 1 Federal, Iron Wash Unit, section 2-24s-13e, Emery County, recovered 175 ft. of oil and 188 ft. of heavily oil-cut mud on 2-hour drillstem test of the Moenkopi at 1,807-65 ft. Scheduled to 6,000 ft. in the Mississippian, the prospect is 40 mi. northwest of production at Big Flat.

In Cabbon County, Great Lakes Natural Gas Corp. No. 1 Unit, section 13-12s-14e, was tested to flow at the rate of 5-million cu. ft. of gas daily plus an unestimated amount of distillate through perforations at 4,953-5,325 ft. The unit, consisting of 30,000 acres, is located in the Stone Cabin area, formerly known as Jacks Canyon.

West Texas—Ashmun & Hilliard No. 3 Ltd. No. 1 Daisy Barbee, section 1, CT&MC survey, Reagan County, was completed as a Wichita-Albany (Permian) lime discovery, flowing 385 b/d of 38.6-gravity oil through 16/64-in. choke and perforations at 6,756-80 ft. The well is 4 mi. southwest of Southeast Garden City field, Glasscock County.

In Winkler County, Cities Service Oil Co. No. 1-B Tubb, section 14, block C-23, psl survey, Bone Springs discovery 3¼ mi. west of the shallow Scarborough pool, has been recompleted for 532 b/d of 49-gravity oil, based on 4-hour flow through 26/64-in. choke and perforations at 9,742-64 ft. and 9,867-76 ft. Gas volume was 2,687,000 cu. ft. per day. This well was first completed for 156 b/d through 20/64-in. choke and perforations at 9,767-76 ft.

New York—A new drilling depth record for New York has been set by New York State Natural Gas Corp. No. 1 Robert Olin, Woodhull Township, Steuben County. The test was drilling below 12,480 ft. last week, far below the 11,145 ft. depth record set for the state in 1953, also by N.Y. State Natural Gas. The rotary-drilled test, being drilled on the company's Woodhull storage pool, also has surpassed the 12,343-ft. depth record for Pennsylvania.

New Mexico—General American Oil Co. No. 1 Brewer-Federal, section 14-16s-29e, Eddy County, flowed 233 bbl. of oil in 16 hours through ¾-in. choke and perforations at 2,061-84 ft. The discovery opened a Penrose sand oil pool 2 mi. east of High Lonesome field.

Northeast Louisiana—Pan American Petroleum Corp. No. 1 Lucile H. Rose, section 32-11n-10e, Tensas Parish, was completed as the discovery for South Holly Ridge field, flowing 26.8-million cu. ft. of gas daily through 7/64-in. choke and perforations at 9,105-06 ft. in the Paluxy.

Wyoming—Pan American Petroleum Corp. No. 3 Sherwood Unit, section 10-40n-77w, Natrona County, was completed for 80 b/d through 12/64-in. choke and perforations at 9,876-94 ft. in the Frontier. The well is located 1 mi. south of the operator's No. 2 Unit which was completed in 1957.

Montana—W. C. Flynn No. 1 Beagle Land & Livestock, section 17-23n-59e, Richland County, recovered 140 b/d of oil and 10 b/d of water on the swab through perforations at 8,967-9,230 ft. in the Mission Canyon. The workover was originally drilled by Sun Oil Co. and others in 1954, bottoming at 13,134 ft. in the Ordovician. The test is 6½ mi. southeast of Bronson field, which produces from the Madison.

Oklahoma—Kingwood Oil Co. No. 1 Talley, section 26-3n-9w, Comanche County, 2 mi. west of Burns pool, was completed for 4,640,000 cu. ft. of gas daily and 29 b/d of 58-gravity distillate through 21/64-in. choke and perforations at 7,595-608 ft. in the Pennsylvanian.

Kansas—Phillips Petroleum Co. No. 2 Llanos, section 10-6s-37w, Sherman County, has been completed on the pump for 120 b/d of oil and 2 b/d of water through perforations at 4,456-62 ft. and 4,474-90 ft. The well, third in the new field, produces from the Lansing-Kansas City. It is the first to be completed in this pay, though the other wells in the field had good recoveries from this horizon on drillstem tests.

they took two!

Left to right: Hugh Liedtke, treasurer, Wayne Dean, vice-president, George Bush, President, of Zapata Offshore Company, Houston, Texas

ZAPATA OFFSHORE CO.

...twice selected LeTourneau Platforms...
praises two-year payoff performances

The SCORPION on location

The VINEGARROON under tow

After two years of successful operation with LeTourneau drilling platforms, President George Bush reports:

"We at Zapata are very proud of the performance of our two LeTourneau platforms. Both the Scorpion and the Vinegarroon have rendered exceptionally fine service to the offshore oil industry and we feel they will continue to do so for some time to come."

The Scorpion has demonstrated its mobility by completing a move from one location to another in less than eight hours—including a two hour tow.

The seaworthiness and ease of handling of the Scorpion were demonstrated recently when a single tug towed it from Galveston to Cay Sal Bank, Bahama Islands,—a distance of over 1000 miles.

The Vinegarroon, too, has proved itself under adverse conditions. In June, 1957, it withstood the full force of the destructive hurricane Audrey. Although the anemometer of the platform registered winds in excess of 100 mph before it was broken, the Vinegarroon was the first mobile offshore platform in the area to resume full scale operations.

LeTourneau platforms are custom engineered and built for a wide range of operating conditions. If you have a situation requiring a new platform we'd welcome the opportunity to discuss it with you. Call us for additional information, or write for descriptive literature. No obligation, of course.

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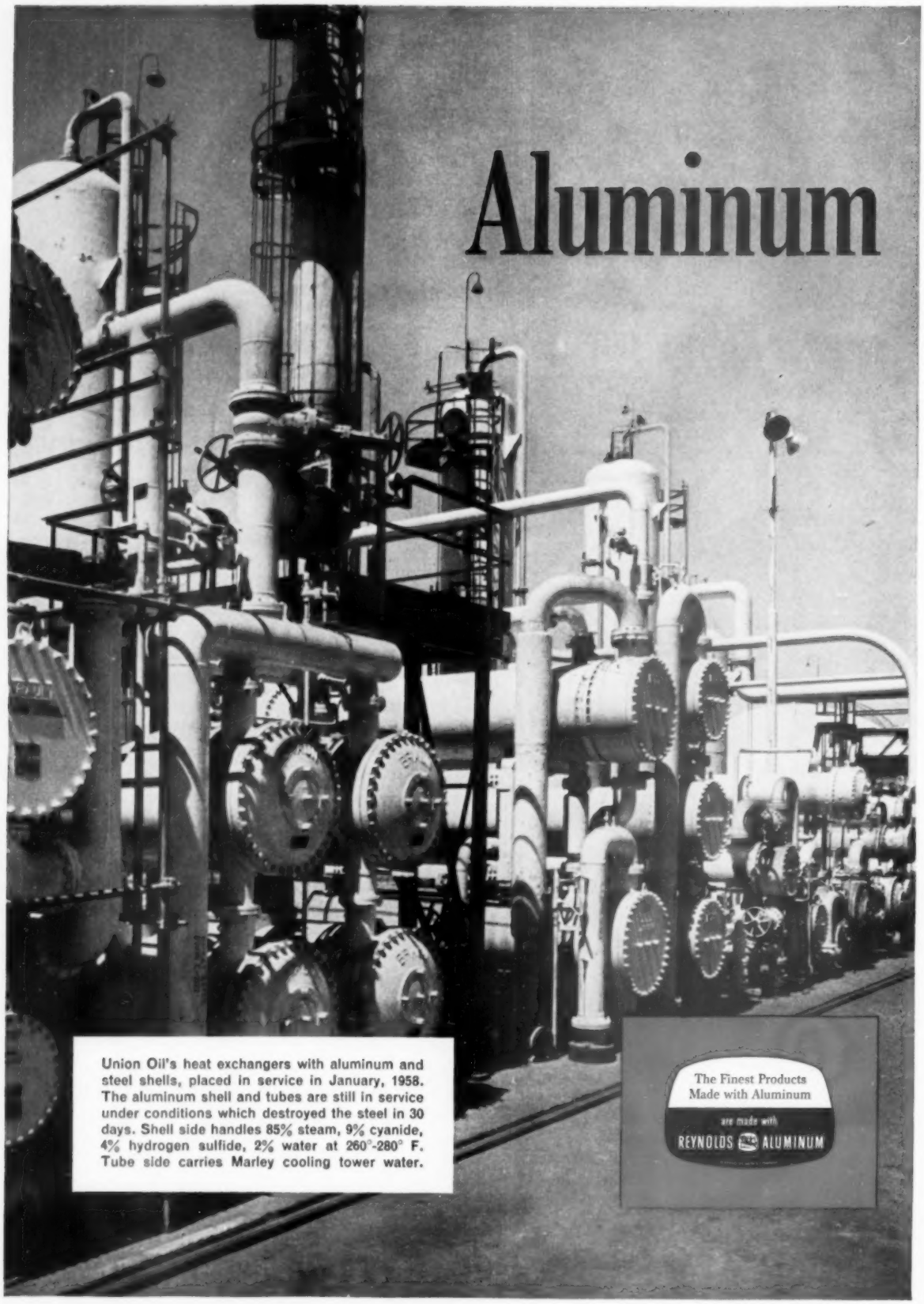
Aluminum
Union Oil's heat exchangers with aluminum and steel shells, placed in service in January, 1958. The aluminum shell and tubes are still in service under conditions which destroyed the steel in 30 days. Shell side handles 85% steam, 9% cyanide, 4% hydrogen sulfide, 2% water at 260°-280° F. Tube side carries Marley cooling tower water.
The Finest Products Made with Aluminum
are made with
REYNOLDS ALUMINUM

Heat Exchangers Last Longer...

up to 7 times longer for Union Oil

Union Oil Company of California is converting several of its shell and tube heat exchangers—and parts of these exchangers—to Reynolds Aluminum. Main reason: aluminum lasts longer in many heat exchanger applications, up to 7 times longer.

For example, in Union's heat exchangers which handle waste water from a refinery cat tower, steel condenser tubes lasted only a few weeks before corrosion made them useless. Aluminum tubes, now in the same service, last 7 times as long handling the same corrosive fluids.

In the same application, steel tube sheet and baffles lasted about 5 months before they had to be replaced. Union engineers replaced these with aluminum and installed aluminum bundles in January, 1957. They are still in service.

The bare tubes of Union's heat exchangers are Reynolds Aluminum alloy 3003-H14, and the tube sheets and baffles are 6061-T6.

Union Oil's aluminum heat exchangers really save in service cost. On a dollars per square foot of heat transfer area per year base, aluminum units are nearly *5 times lower in cost* than the same units with seamless mild steel. This does not include handling costs, which favor lightweight aluminum.

Initial cost, incidentally, is virtually the same for aluminum and steel in these uses.

Heat exchangers are just one of many places Reynolds Aluminum is cutting costs in this industry. Its resistance to corrosion, its passivity, light weight and strength make aluminum *the* logical material for tanks, vessels, jacketing, piping, tubing, and other applications where corrosives must be handled or stored.

To learn how aluminum can cut your costs, write the people who know aluminum and its uses in the chemical and petroleum industry—*Reynolds Metals Company, P.O. Box 2346-CP, Richmond 18, Virginia.* Or contact your local Reynolds branch office, listed under "Aluminum" in the classified phone book.

Write today for Reynolds free bulletins—
"Aluminum for Heat Exchangers" and "Keys to Corrosion".

REYNOLDS ALUMINUM

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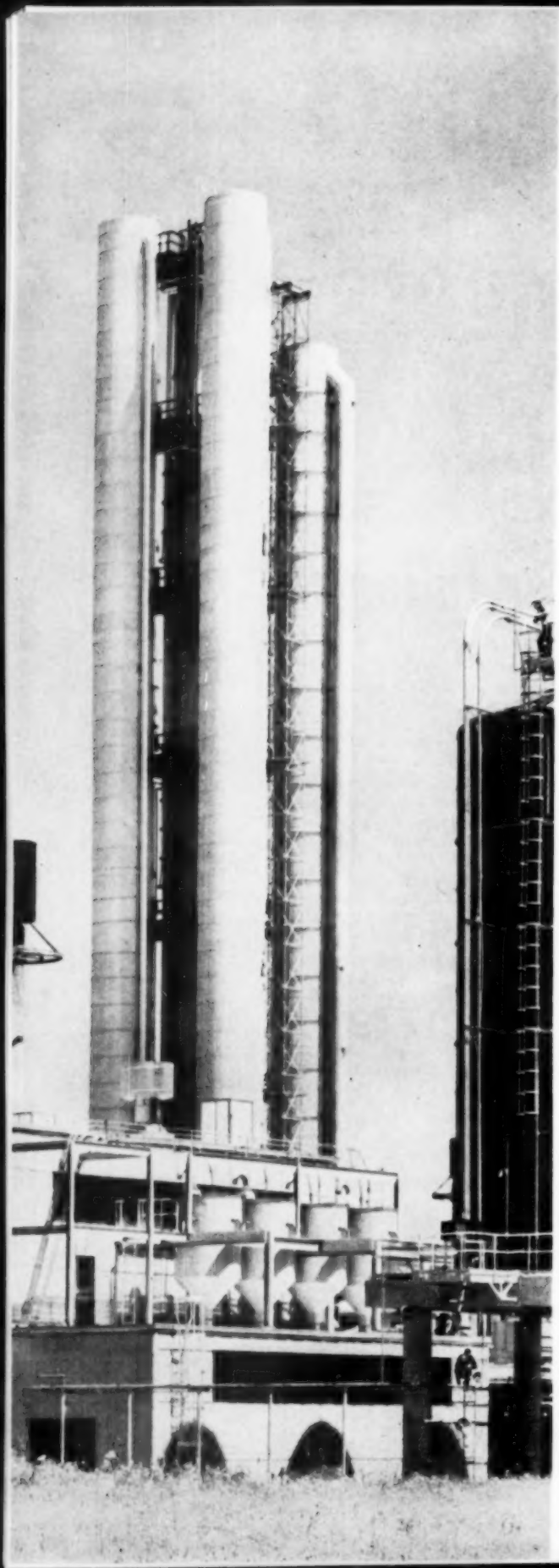


Petrochemical

The petrochemical industry continues to be one of the great "growth industries" of the United States. It now accounts for 56.6% of the dollar value of all U.S. chemicals (up 1.1% from last year), and for 27.9% of total U.S. chemical tonnage produced (up 4.0% from last year), according to figures released by Dr. R. L. Bateman, director of product development for Union Carbide Chemicals Co. The Bateman figures are based on interpretation and clarification of basic U.S. Tariff Commission figures.

Even in a depressed year such as 1958, Bateman's figures show, physical volume of petrochemicals produced increased 5.5% over 1957, and dollar value increased 5.7%. This compares to an increase of only 2.0% for all chemical production, and of 4.6% for all chemical dollar value, during the same period.

But bright as petrochemical-industry growth seems, there is a sobering side: The growth has resulted in many areas of temporary over-capacity. A few of the petrochemicals whose production capacity far outstrips the market are ethylene, butadiene, aromatics, ammonia, styrene, polyethylene, and synthetic rubber. Further details on these and other petrochemicals are given in the following sections of this report.

"Glamour" in the word "petrochemicals" lured many newcomers into the field—many of them naive in chemicals market analysis and sales. Often the result has been to anticipate consumer demand by several years—in some cases to the mid-1960s.

"A lot of oil companies jumped into the petrochemicals field in a rather unsophisticated manner," says the head of an oil company's petrochemical section, "and now there are some awfully sore stomachs and ulcers from having to live with these investments until the market grows to meet them."

Too many oil companies are guilty of giving their petrochemical activity a "poor cousin" status—merely a way to dump low-value refinery byproducts in an effort to upgrade their market values. With this approach, this same oil company man says, it is difficult to make a going proposition of petrochemicals. The oil company must realize that it has entered the very competitive chemicals market, and must learn that the ways of chemicals sales are not the same as those of fuels sales.

All too often, these newcomers not only misgauge the total market for their product, but also grossly underestimate the "cost of doing business." These costs include not only the more obvious ones, such as costs of startup, inventories, financing, and plant operations, but also include laboratory and research work, a very specialized sales force and applications group, depots for quick shipment to customers, and many others.

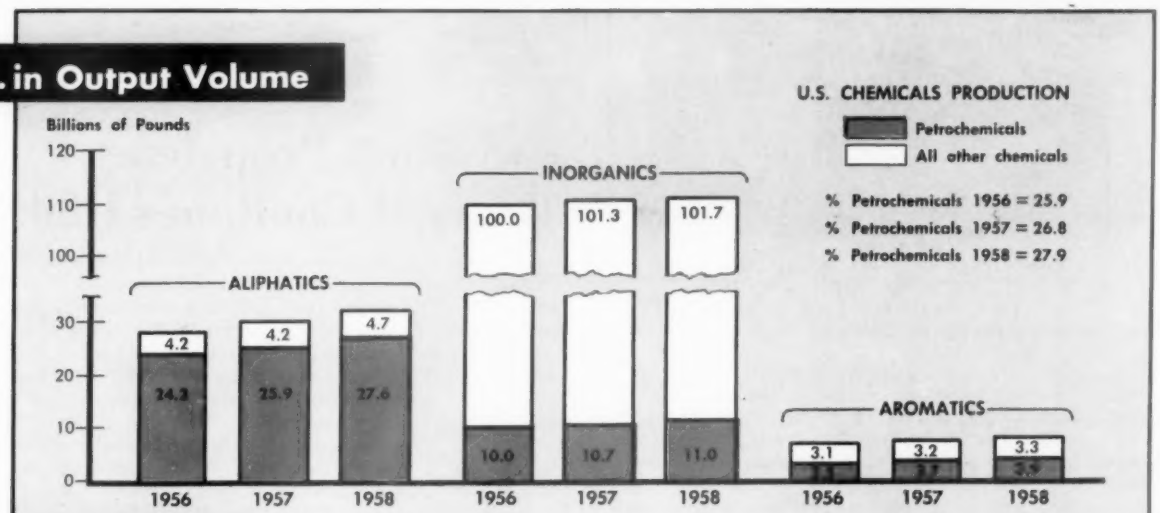
The polymer and plastics fields appear to be the most promising in the long run for petrochemicals. About one-half of all petrochemicals are used to make fibers, plastics, or elastomers and synthetic rubbers.

These products have had phenomenal market growth. However, the over-all field has not developed as fast as

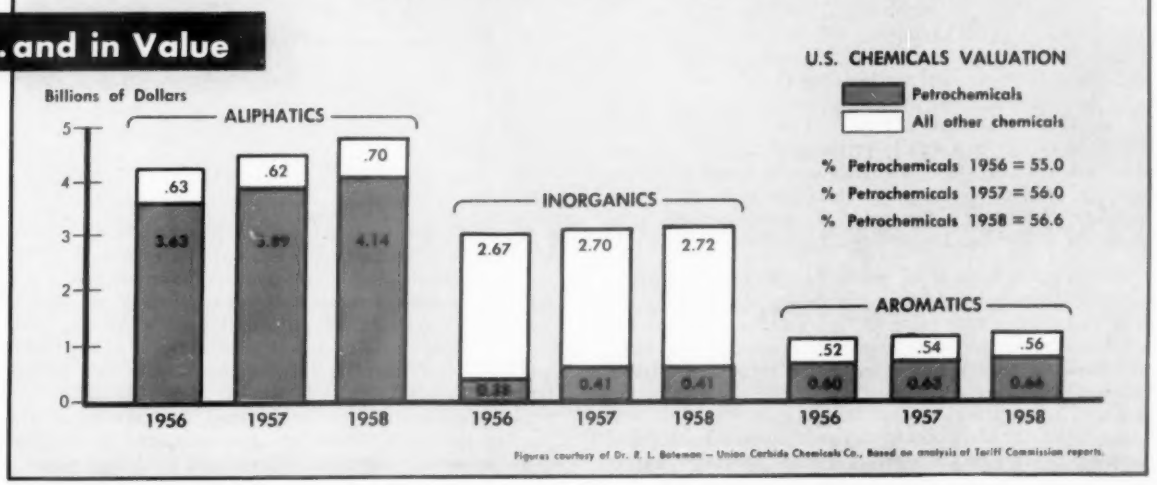
POLYSTYRENE PLANT of Cosden Petroleum Corp. at Big Spring, Tex., is the first integrated "from crude oil to plastic."

Industry Continues Its Boom...

...in Output Volume



...and in Value



Figures courtesy of Dr. R. L. Bateman — Union Carbide Chemicals Co., Based on analysis of Tariff Commission reports.

some producers thought it would. Part of this can be explained by the rapid development and commercialization of new plastics, resulting in stiff market battles between producers of similar materials.

An example can be found in the applications overlap between polystyrene, the various polyethylenes and polypropylene. Each of these materials has an area of use where it excels. But there are other uses where there is no distinct preference; it is in these that the overlap has made itself felt.

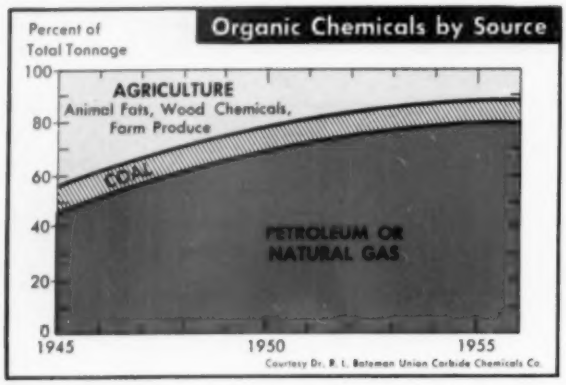
Or, as L. S. Bergen, chief economist for M. W. Kellogg Co. puts it, "The [plastics] derby is coming up about three years from now. The market for newer plastics is there—but for which one"

Adding to long-range optimism for petrochemical polymers are large-volume markets which producers feel almost in their grasp. Not only do fibers offer much room for petrochemical growth, but the plastics and rubber industries are eyeing such large scale markets as piping, construction, household appliances, automobiles, and perhaps plastic cans for food. Films for packaging and other uses offer additional expansion opportunities for existing and new plastic materials.

In general, aliphatic chemicals appear to have a greater market growth potential than either aromatics or inorganics in the petrochemicals field.

Part of this is because a lot more attention has been given to research on aliphatic petrochemicals, such as ethylene, propylene, butadiene, and others. These in turn are the basis for most of the synthetic fibers, plastics, and synthetic rubbers made today. According to Bateman, "Historically, and most likely for the foreseeable future, ali-

continued ▸



OIL AND GAS are now the source for about 80% of all organic chemicals—close to double their 1945 share.

phatic chemicals are predominant as raw materials for organic chemicals manufacture." And, as is shown by the accompanying chart prepared by Bateman, petroleum and natural gas have taken an ever increasing piece of the "organic chemicals raw materials" picture.

Aromatics, such as benzene, toluene, xylenes, and ethylbenzene, now account for about 9% of all petrochemicals and about 4% of all chemicals. While they will continue to find new chemical markets, their growth potential does not appear to be so spectacular as for the aliphatics.

As for petrochemical inorganics (ammonia, sulfur and its compounds, and carbon black), there is a good chance that by 1960 their growth in production capacity will not even keep up with the 3% annual rate at which our gross national product is growing. This slowdown is already apparent. Estimated dollar value for petrochemical inorganics for 1958 is no higher than those reported for 1957.

But it's going to be a lot harder to cash in on the growing petrochemical market in the future. Companies will have to be more discerning in their selection of projects, will have to spend more money to develop them, and will have to seek markets for which they can offer a "unique" product.

The "honeymoon" period for petrochemicals is over. Gone is the day when almost any petrochemical could find a rapid and unlimited market. There are fewer market "voids" to fill.

According to one petrochemical company spokesman, producers will have to integrate more closely to the finished product, rather than just furnish raw materials, to make a reasonable profit.

While this will afford a better return on investment, it is not without its penalties. The company must spend large sums for research to find a new material, a new product, a new process, or some outstanding improvement over existing products or processes. It will have to set up extensive market-development and customer-service departments. An entirely new type of sales force will have to be assembled and trained.

And finally, there is always the risk of early technological obsolescence if the product is replaced by one still newer.

Ethylene, Propylene Demand Continues High

Ethylene and propylene, both versatile petrochemical raw materials, will continue to have expanding markets—at least for the next few years. Ethylene production should reach 5-billion lb. in 1961, more than 20% above 1958 production. Propylene use in chemicals should reach 2.4-billion lb. in 1961, more than 25% over 1958, according to J. H. Glover, manager of the commercial development division of Jefferson Chemical Co., Inc.

By the end of this year, ethylene production capacity will be about 5-billion lb. a year. In addition, there are other plants, either planned or under construction, due to come on stream after 1958, which will add to this capacity. Thus, ethylene capacity appears to be ample for the next several years, in the light of expected demand:

	Ethylene production millions of lb.
1955	3,048
1956	3,602
1957	3,946
1958 (est.)	4,150
1961 (est.)	5,000

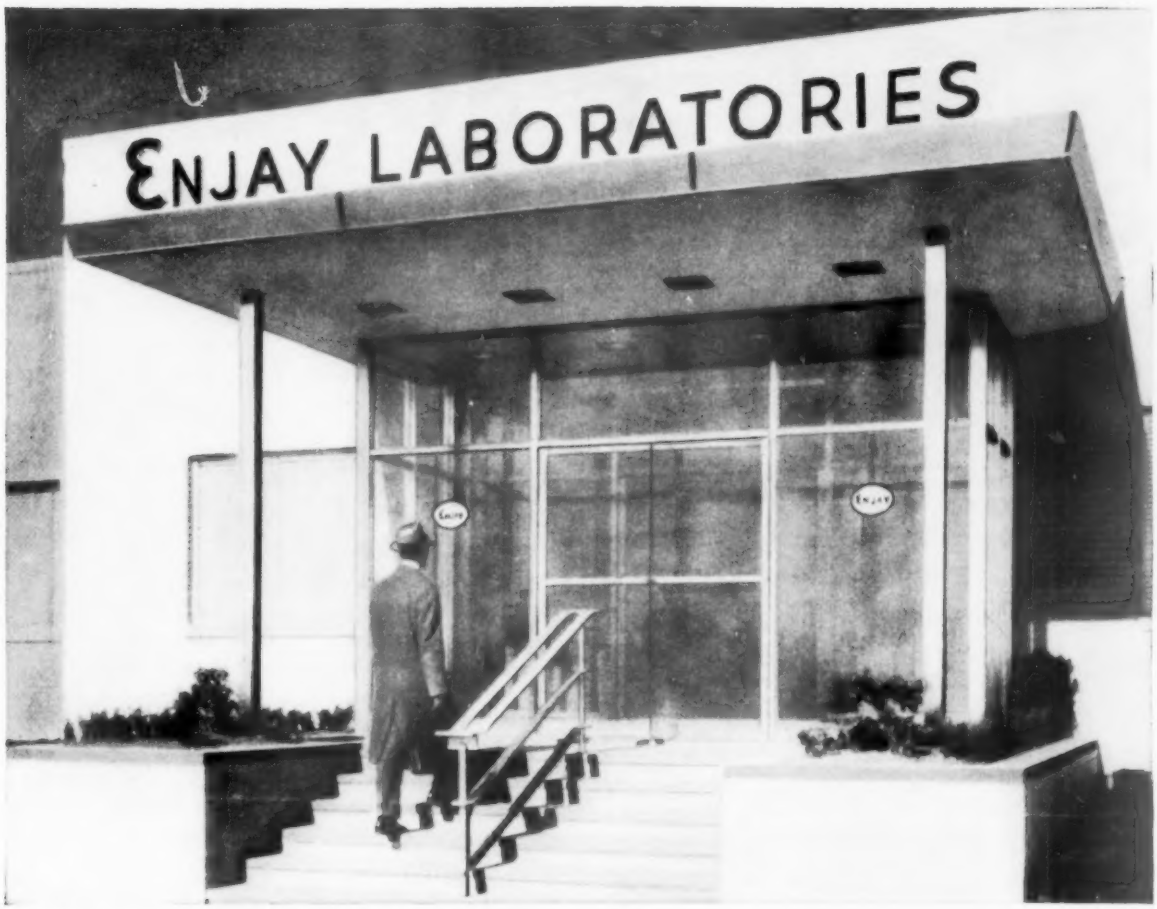
The preferred feedstock for an ethylene unit is refinery off-gas rich in ethane. This accounts for over half of the present ethylene production capacity. However, only a few refineries remain in the country with sufficient uncommitted off-gases to feed a 200-million-lb.-a-year unit—the minimum capacity for economical operations in a new plant according to Glover. Thus, other feedstocks, such as propane and butane, will become increasingly important.

For propylene, on the other hand, the concept of production capacity has no meaning as compared to ethylene, since almost all propylene is produced as a byproduct of other operations. Over 20-billion lb. a year comes from refinery cracking operations and cracking of propane or butane for ethylene manufacture—well in excess of present and near future chemical needs. The excess, over that needed to make chemical products, is used in refineries in

continued ▸

"Companies in, or getting into, the petrochemicals field will have to plan more, spend more on research, and perhaps build facilities for more end products which would be more costly."

R. L. BATEMAN, *director of product development,*
Union Carbide Chemicals Co., New York, N.Y.



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1936 —*Lube oil inhibitors introduced.*

1937 —*Enjay's Butyl rubber discovered.*

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1943 —*Butyl rubber produced in Government-owned plants operated by Enjay affiliates.*

Mid-1940's —*Broad line of petrochemicals introduced by Enjay.*

1948 —*First commercial Oxo plant in U. S. operated by Enjay affiliate.*

1955 —*Enjay markets Butyl rubber produced in plants acquired from the Government.*

1957 —*U. S. Army approves all-Butyl tires; high purity dicyclopentadiene becomes available.*

1958 —*Enjay announces that marketing of polypropylene will begin in 1959.*

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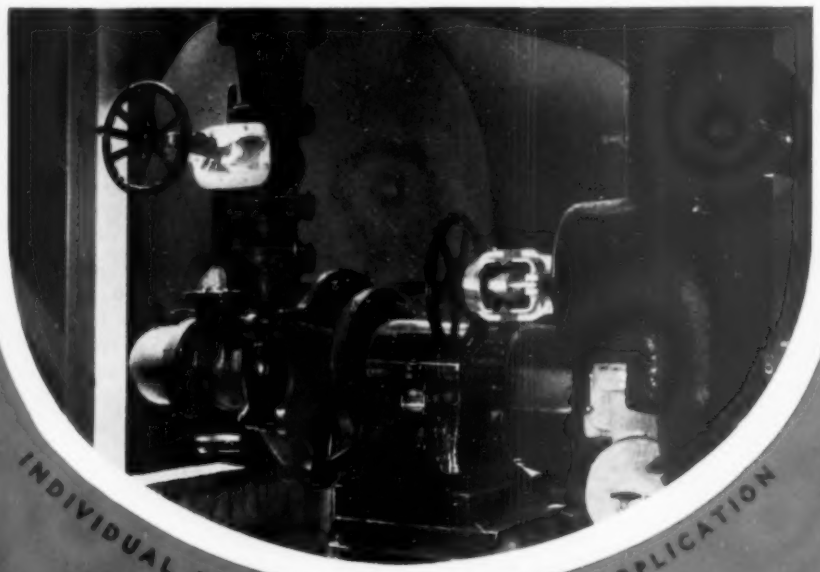

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either polymerization or alkylation operations, or is burned as fuel.

Ethylene oxide, ethyl alcohol, and polyethylene are the three largest uses for ethylene. These accounted for over 70% of total ethylene use during 1957. Of these, however, polyethylene is the fastest growing ethylene derivative, and should overtake ethylene oxide by 1961.

The relative importance in 1957 of these and other ethylene derivates, in terms of ethylene consumption, is shown in the following table:

	Ethylene consumption in 1957, millions of lb.	% of total
Ethylene oxide	1,210	31%
Ethyl alcohol	810	21
Polyethylene	780	20
Styrene	370	9
Ethyl chloride	290	7
Ethylene dichloride	250	6
Others	236	6
Total	3,946	100%

Production of ethylene oxide in 1958 will be about the same as 1957's 1,236,000,000 lb., says Glover. However, the use of ethylene glycol, oxide's most important derivative continues to increase. Several new oxide producers entered the field this year, and present capacity is ample to meet needs for the next several years.

Ethyl alcohol is a mature chemical, and no great growth is forecast for it by Glover. Synthetic ethyl alcohol from ethylene accounts for about 85% of industrial alcohol; the rest is made by fermentation. Production of synthetic ethyl alcohol was 1⅓-billion lb. (190-proof basis) in 1957; in addition, some was imported for U.S. use. For the first six months of 1958, the production rate was 1½-billion lb. a year, and some of it was exported.

Production of polyethylene, the fastest growing ethylene derivative, reached 707-million lb. in 1957. In 1958 it will challenge ethyl alcohol for second place in ethylene's end-use pattern, and by 1961 should overtake ethylene oxide as top ethylene user.

A modest increase in the market is forecast for other principal ethylene uses—styrene, ethyl chloride, and ethylene dichloride. Styrene production in 1957 was 1,165,000,000 lb., a slight increase from the 1,140,000,000 lb. produced in 1956. Production for 1958 is at a lower rate than in 1957.

Ethyl chloride, most of which is made from ethylene, is used in the manufacture of tetraethyl lead fluid. Therefore, its use is related to gasoline consumption. Total production of ethyl chloride in 1957 was 604-million lb.

Ethylene dichloride's most important uses are in the manufacture of vinyl chloride and use with tetraethyl lead. Total production in 1957 was 800-million lb. Ethylene dichloride is made by direct chlorination of ethylene, and as a byproduct in the chlorohydrination process for ethylene oxide. Production from the latter source is decreasing.

Propylene, as a raw material for polypropylene, has been in the limelight during the past year. However, propylene consumption for chemicals has been substantial for years, and established chemical uses may well contribute more to propylene's market growth in the 1958-to-1961 period than polypropylene, according to Glover.

Chemical consumption of propylene (apart from its use in fuels manufacture) is shown in the following table for the years 1955 to 1961:

	Propylene consumption, millions of lb.
1955	1,620
1956	1,700
1957	1,820
1958 (est.)	1,900
1961 (est.)	2,400

The older uses for propylene do not require a high-purity material, and many of the streams are used on an "as is" basis. However, polypropylene requires a high degree of purity; there are at present four producers offering 90% to 95% product, and one offering 99% product.

The relative importance of the various chemical derivatives of propylene is shown in the following table (polypropylene was not yet a factor):

	Propylene consumption in 1957, millions of lb.	% of total
Isopropyl alcohol	1,070	59%
Propylene trimer and tetramer	430	24
Allyl chloride and acrolein	100	5
Propylene oxide and derivatives	100	5
Cumene	50	3
Butyraldehyde	40	2
Other	30	2
Total	1,820	100%

Though isopropyl alcohol is the largest chemical user of propylene, second-place propylene tetramer and trimer have a better growth potential, Glover says.

Total production of isopropyl alcohol was 1.2-billion lb. in 1957. Requirements of propylene for this use, however, are not expected to change significantly in the future. Acetone, an important derivative of isopropyl alcohol, will be produced increasingly as a byproduct from other chemical processes.

Propylene tetramer and trimer are used as chemical intermediates for dodecyl benzene and nonyl phenol for making surface active agents (surfactants). Continued, but small, growth is expected for these products.

Propylene oxide has a bright future as a raw material for propylene glycols, which are now the preferred glycols for production of flexible urethane foams. These foams, used as cushioning materials for furniture and automobile seats, are just this year really beginning to establish themselves (page 70).

Allyl chloride, acrolein, and butyraldehyde will also contribute to a growth in the consumption of propylene.

The future of allyl chloride and its co-products, acrolein, is closely related to demand for epoxy resins and synthetic glycerine. Other uses for these chemical intermediates are of minor importance.

In 1957, only 2% of chemical propylene was used in the manufacture of butyraldehyde via the Oxo process. A new plant for butanol via the Oxo process is being built, and should increase propylene requirements substantially.

Propylene for polypropylene is still somewhat of an unknown quantity. Essentially negligible in 1957, the potential market is showing signs of strength with recent activity in the polypropylene field (page 62).

continued ▶

There's Way Too Much Butadiene Capacity

Butadiene manufacturers, now operating at reduced capacities, can look forward to little better than operating at almost 70% of capacity in 1959 and a little over 70% in 1960. After that, the growth in the butadiene market will be only 2% to 3% a year, according to R. L. Ericsson, vice president and general manager for Texas Butadiene & Chemical Corp.

By 1960, butadiene should be moving at about an 800,000 ton rate annually. Also by that time Europe will have in the neighborhood of 350,000 to 400,000 long tons of butadiene production, making Europe completely self-sufficient, with no need for U. S. exports.

Since almost 90% of the butadiene produced goes into synthetic rubber and latex, the butadiene market is very sensitive to synthetic rubber production and synthetic rubber's biggest customers—automobiles and furniture.

The effect of the current recession on synthetic rubber production (p. 65) has depressed the market for butadiene, since butadiene is a major ingredient of the largest-volume synthetic rubber—butadiene-styrene.

Thus, the drop in production of cars and new tires for them, and the drop in the foam and latex market for butadiene-styrene rubber in car and furniture cushioning, have fostered an over-capacity situation for butadiene.

"On-purpose" butadiene from butane dehydrogenation suffers from an excess of "excuse-me" butadiene coming from refinery gases and as a byproduct of ethylene manufacture, says Ericsson.

Of the three major sources for butadiene in the U. S., the largest is catalytic or steam cracking of butylenes from refinery C_4 cuts (butanes and butylenes, the so-called "B-B" cut). This source accounts for about 60% of total U. S. butadiene capacity.

The second largest source of butadiene, dehydrogenation of field or refinery butanes, is relatively new. In 1957, four firms came on stream with plants using the Houdry Process Corp. butane dehydrogenation process. These plants have a combined capacity of 300,000 tons a year butadiene, and now account for about 30% of total U. S. butadiene capacity.

The remaining 10% of butadiene capacity results from ethylene manufacture. Depending upon the raw material going into the ethylene plant, butadiene can amount to 10% to 20% of the plant's output.

And "excuse-me" butadiene will continue to exceed "on-purpose" butadiene production for the foreseeable future. Since ethylene production will continue to increase for at least the next couple of years, Ericsson believes that the amount of butadiene made as a byproduct of ethylene manufacture could go well over 200,000 tons annually.

Any expansion of butane-dehydrogenation capacity will come primarily from established butadiene manufacturers and from those who have "captive" uses for butadiene—i.e., synthetic rubber manufacturers who furnish their own markets for butadiene.

But the fact that butadiene has only recently been freely available explains why this extremely versatile chemical has not been explored completely. More research attention for new uses may change its market pattern greatly in the future.

Prior to about 18 months ago, when butadiene became available from butane-dehydrogenation plants, it was either under government control, or in short supply, and therefore did not attract much research into other uses.

Currently, the only significant use for butadiene, other than in synthetic rubber, is in the manufacture of adiponitrile, a Nylon intermediate. And in this use butadiene must compete with benzene, petroleum cyclohexane, and furfural.

National Petro-Chemicals Corp. is using butadiene to make isosebacic acid. But this use is not too important yet in volume. Butadiene has also been used in a fungicide marketed under the tradename of Captan. There are also other applications, but none with volumes or potential volumes approaching that of the butadiene used in synthetic rubbers.

Another great hope for butadiene is the polybutadiene rubbers, useful as natural rubber extenders. These are so-called "stereo-directed polymers" with oriented crystal structures instead of the usual random distribution of the polymer molecules. Just how well polybutadiene rubbers will be accepted is not known, but Phillips Chemical Co. is doing a lot of work on them.

Countering research into new butadiene uses is concurrent research to find substitutes for present butadiene uses. Polyisoprene rubber (isoprene coming from the dehydrogenation of pentanes) resembles natural rubber very closely. However, its cost is still high, and it is difficult to forecast its future.

Certain ethylene-propylene copolymers are being developed as possible competitors for butadiene-styrene rubbers. While these ethylene-propylene copolymers are potentially cheaper than any other rubber, it remains to be seen whether they can be produced more cheaply. And besides, Ericsson says, it takes a long time to find market acceptance for a new rubber.

continued ▸

"Butadiene is extremely versatile chemically and has not been completely explored. Who knows what the future may hold? It may be used in rockets some day."

R. L. ERICSSON, *vice-president & general manager,*
Texas Butadiene & Chemical Co., Houston, Tex.

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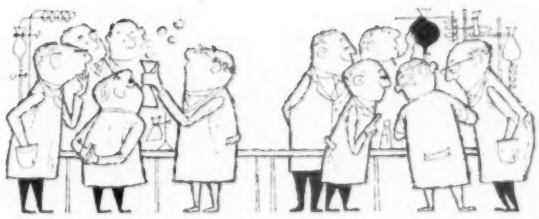

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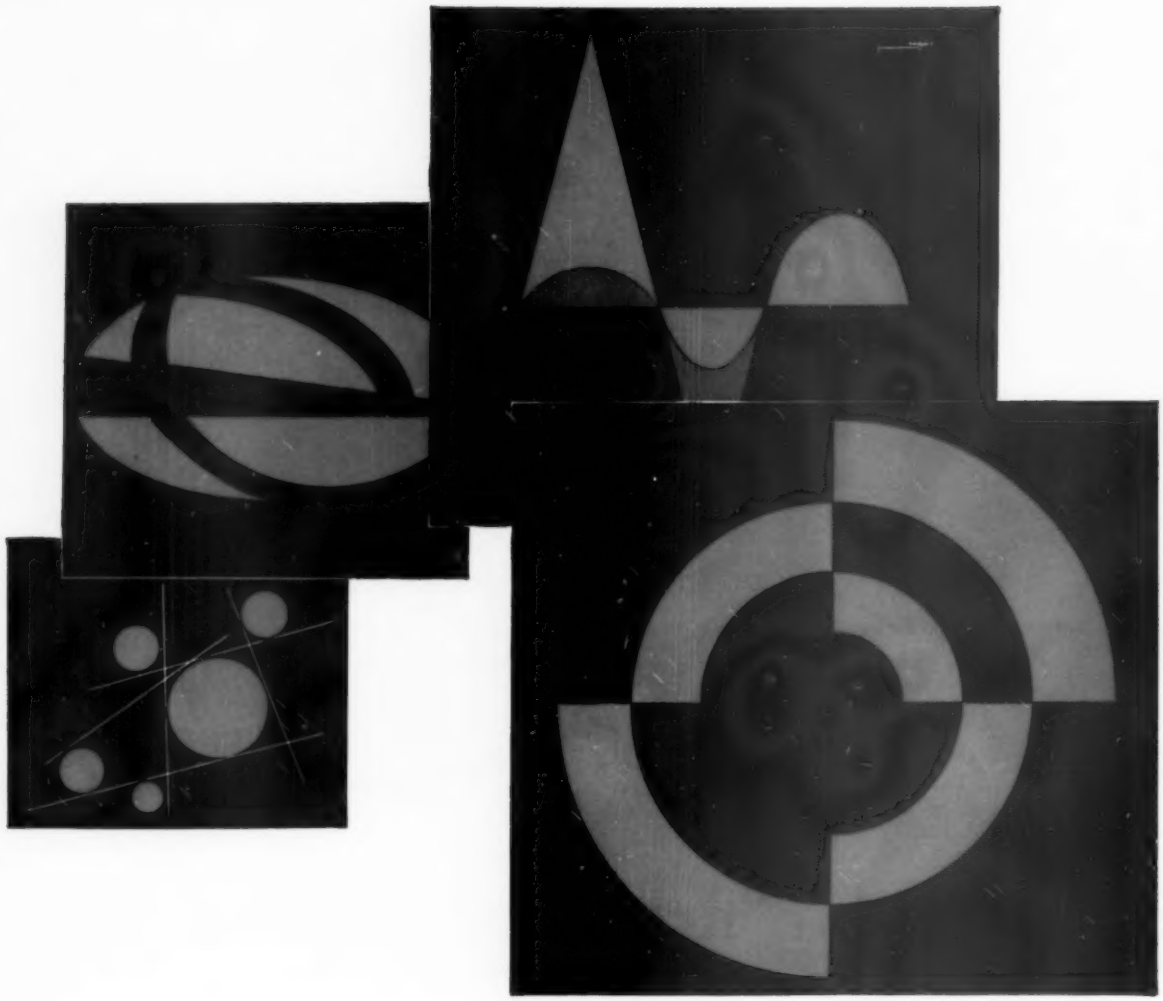

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Plenty of Aromatics—Competition is Tough

During the past twelve months, the volume of aromatics available from petroleum sources has increased materially, and the market price has declined because of new producers entering an already saturated market and attempting to find a place for themselves, according to H. E. Bramston-Cook, vice-president of Oronite Chemical Co.

Much of the sales pressure in the pure aromatic hydrocarbon field has been from the increasing number of Platformers and Udex plants installed in relatively small refineries that have little need for aromatics in large amounts for gasoline blending.

The lure of aromatics for chemical use to small refiners has been high profit margins. However, recent sharp price reductions and lack of flexibility in meeting market demands have dulled some earlier optimism.

Lack of flexibility is the greatest problem confronting small refiners producing aromatics. Lack of still capacity, tankage, and limited availability of feedstocks often prevents small refiners from operating to produce essentially one aromatic (benzene, toluene, or mixed xylenes), Bramston-Cook says.

Large operators, on the other hand, usually have ample feedstock, close-cutting stills, and process tankage to make benzene, toluene, or mixed xylenes at will—and in any combination or proportion desired. Moreover, their larger gasoline operations make a valuable spot for the unfractionated aromatics in high-knock-rating gasolines.

Thus the smaller operators find themselves in trouble when there is a market for one aromatic, but an excess of the others. Since it is costly to dump Udexed aromatics into gasoline, sale at less than posted market prices generally is the solution. This then leads to further weakening of markets already under pressure.

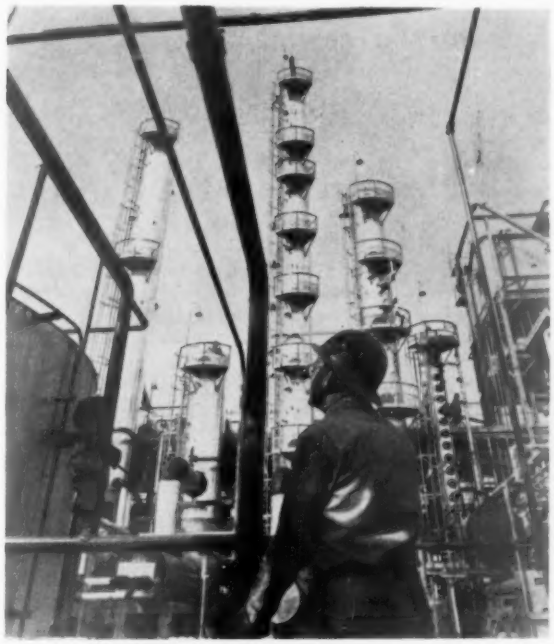
Based on operating installations and those announced for completion by the end of 1959, estimated potential production of aromatics from petroleum will be about 750-million gal., according to Bramston-Cook.

Of this figure, benzene capacity is estimated to be 220-million gal. The balance will be approximately 200-million gal. of toluene, and 330-million gal. of mixed xylenes. However, blocked operations in larger units could modify the proportions between these reformer-made aromatic chemicals appreciably.

Present petro-benzene capacity, together with domestic coke-oven and tar distillers production, is adequate to meet estimated U.S. chemical needs through 1965. Benzene production computed for 1957 and estimated through 1965 are shown in the following table in millions of gals.

	1957	1960	1965
Petroleum	116	130	190
Coke-oven	179	200	215
Tar distillers	36	40	50
Imports (net)	51	50	50
Total	382	420	505

Imports are up to 50-million gal. a year because of the willingness of Iron Curtain vendors to sell benzene to the U.S. at prices as low as 20¢ a gal., f.o.b. shipping point.



ETHYLBENZENE from this Koppers Co. plant at Port Arthur, Tex., is used by Koppers to make styrene at Pittsburgh.

Some duplication between 1957 imports and 1957 reported production is possible, since much of the imported product was of unsatisfactory quality and had to be rerun to meet customer specifications.

Benzene consumption in the U.S. reported for 1957 and estimated for 1965 is shown in the following table in millions of gals.

	1957	1965
Styrene	140	170
Phenol	65	106
Alkyl benzene	31	40
Cyclohexane	30	33
Aniline	14	23
DDT	12	9
Mono- & dichloro benzene	9	11
Maleic anhydride	7	22
Miscellaneous	35	50
Total	343	464

Toluene was in easy supply during 1957, and may be expected to remain so for some time to come, Bramston-Cook says.

No new large-scale uses for toluene in chemicals manufacture have been announced during the past year. Probably the greatest expansion for toluene use has been in gasoline blending, for which purpose it is not necessary to separate the toluene from the basic mixture with the other aromatics in the stream.

The expected growth in demand for tolylene diisocyanates has been slower than anticipated, though the outlook is still promising. Other newer applications have not ex-

continued ▸

panded to really large tonnages. Production and exports reported for 1957 and estimated for 1960 and 1965 are shown in the following table in millions of gallons:

	1957	1960	1965
Petroleum	155	170	195
Coke-oven	38	48	53
Tar distillers	5		
Exports	(—)24	(—)15	0
Total	174	203	248

The supply of mixed xylenes increased sharply during the last twelve months, and no shortage for the production of xylene isomers is anticipated for years to come, Bramston-Cook reports.

This ample supply is despite the demand for xylene as an essential ingredient in gasolines. Reported 1957 production and estimated 1960 and 1965 production data are shown in the following table in millions of gals.

	1957	1960	1965
Petroleum	115	180	300
Coke-oven	11	14	15
Tar distillers	1		
Total	127	194	315

Some 1957 petroleum xylene production was used in motor fuel blending. This represented only a fraction of the amount present in high-knock rating fuels.

The use of paraxylene should see a rapid expansion in the near future. The use of paraxylene for polyester fiber manufacture advanced in various countries, although this synthetic fiber usage in the U.S. has not expanded to any extent during the past year.

The advent of Du Pont's newly announced type 64 Dacron polyester fiber, plus new polyester films and fibers currently in development, should assist in increasing paraxylene use.

Both metaxylene and orthoxylene seem destined for increased use, says Bramston-Cook. There is real evidence of a pick up in the consumption of metaxylene during the last four months for the production of isophthalic acid.

Orthoxylene may be on the threshhold of a new future as a competitor to naphthalene in the production of phthalic anhydride. A recent announcement of improved economics in this operation has provoked a large-scale test to be conducted during the last quarter of 1958.

However, the potential production of orthoxylene from presently separated petroleum mixed-xylene streams is only about 165-million lb. a year—roughly equal to only one-half the annual production of phthalic anhydride, even on the improved yield basis reported. On the other hand, work directed toward production of naphthalene from petroleum has advanced to the pilot plant stage.

Refiners Make More Sulfur Than They Use

The petroleum industry changed from a net consumer of sulfur in 1950 to a net producer of sulfur in 1958, according to Gino Giusti, engineering economist for Texas Gulf Sulphur Co.

Most of the sulfur production credited to the petroleum industry is accounted for by recovery of spent treating and processing acids, and recovery of sulfur and sulfuric acid from hydrogen-sulfide-containing refinery and natural gases.

Sulfur is consumed by the petroleum and petrochemical industries to produce alcohols, petroleum alkylates, petroleum sulfonates, synthetic detergents, carbon disulfide, and for other uses.

In 1950, the estimated gross consumption of sulfur (mostly as sulfuric acid) for these purposes was about 700,000 long tons, with a net consumption of about 300,000 long tons. By 1957, the gross sulfur consumption had reached an estimated 1-million long tons, with a net consumption of about 350,000 long tons. The differences between the gross and net consumption figures are accounted for by the recovery of spent processing acids, according to Giusti.

Comparing these net consumptions with net sulfur production from refinery gases (both as elemental sulfur and as sulfuric acid from direct oxidation of hydrogen sulfide) and natural gas shown in the following table, the petroleum industry had a sulfur deficit of 118,000 long tons of sulfur in 1950 and a surplus of 296,000 long tons in 1957.

	Sulfur from Refinery Gases		Sulfur from natural gas long tons	Total sulfur from petroleum industry, long tons
	Elemental sulfur, long tons	Sulfuric acid (as sulfur) long tons		
1950	25,000	40,000	117,000	182,000
1951	40,000	56,000	144,000	240,000
1952	55,000	63,000	196,000	314,000
1953	90,000	76,000	252,000	418,000
1954	100,000	69,000	259,000	428,000
1955	135,000	90,000	274,000	499,000
1956	190,000	85,000	285,000	560,000
1957	265,000	86,000	295,000	646,000

Recovery or use of sulfur values from spent refinery processing acids has increased over four-fold since 1950. Sulfuric acid recovered by regeneration of refinery acid sludge was about 162,000 tons (100% acid basis) in 1950. By 1956 this figure had grown to 735,000 tons. More

continued ▸

"The lure of aromatics for chemical use to the small refiners has been high profit margins. However, sharp price reductions have dulled some earlier optimism."

H. E. Bramston-Cook, *vice-president,*
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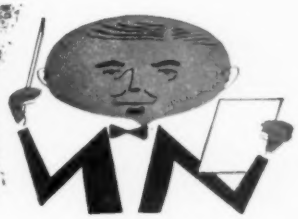

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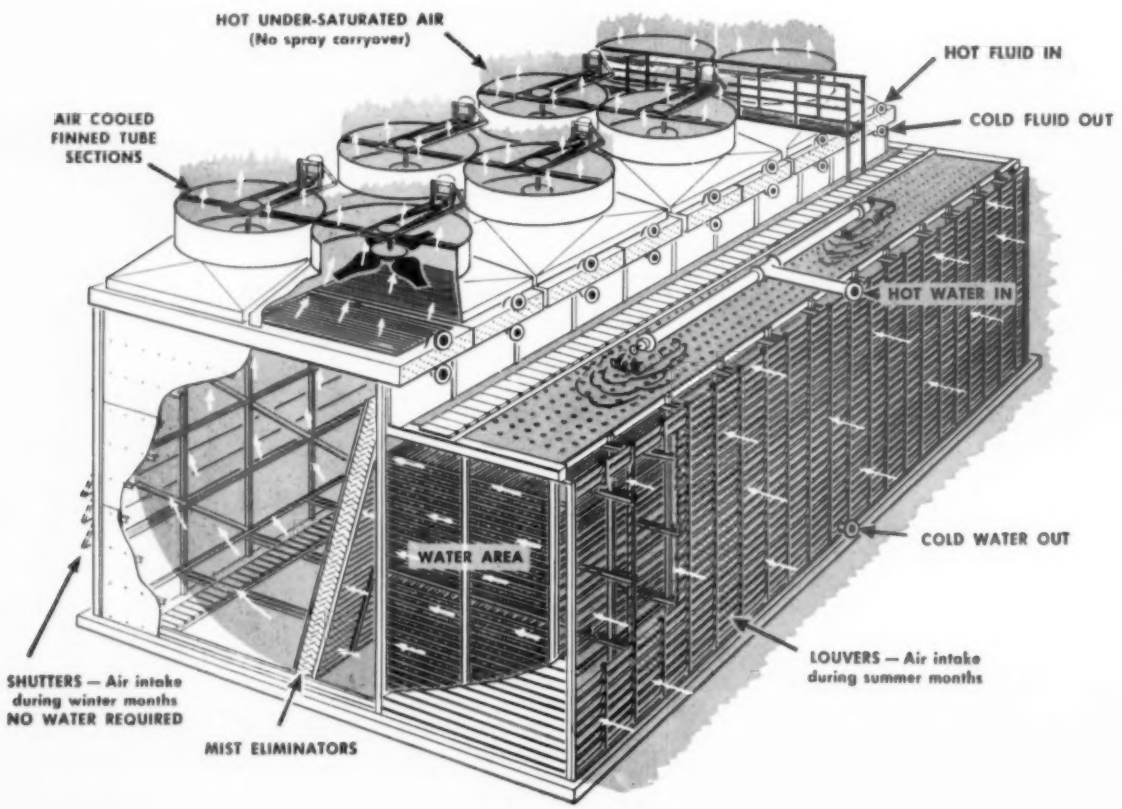
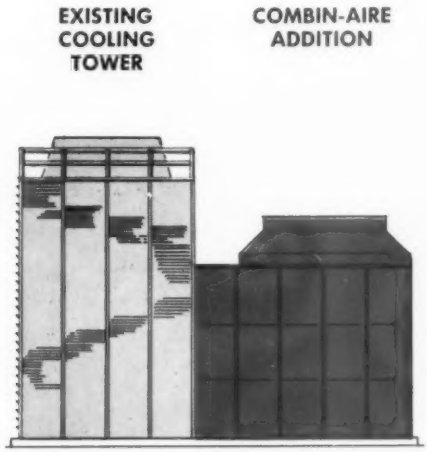

HOT UNDER-SATURATED AIR
(No spray carryover)
HOT FLUID IN
COLD FLUID OUT
AIR COOLED FINNED TUBE SECTIONS
HOT WATER IN
WATER AREA
COLD WATER OUT
LOUVERS — Air intake during summer months
SHUTTERS — Air intake during winter months NO WATER REQUIRED
MIST ELIMINATORS

When Combin-aires are installed as adjuncts to cooling systems using existing shell and tube or other water cooled equipment the cooled water from the bottom of the Combin-aire may be used in such equipment. The Combin-aire then takes on the additional function of a water cooling tower with, however, the advantages over conventional cooling towers of dual use of both air and water and elimination of water spray carryover and condensate precipitation.

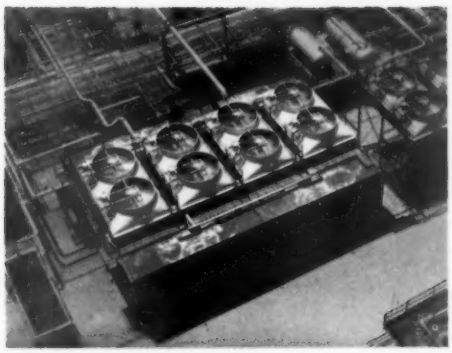
In over 80 services and under a wide range of atmospheric operating conditions Combin-aire units have amply fulfilled performance and mechanical specifications. Before proceeding with a new process unit or revamping or adding to present cooling systems let Hudson give objective assistance in determining the most economic balance in the use of air cooling, Combin-aire cooling and water cooling.

CONVERTING COOLING TOWERS INTO COMBIN-AIRE UNITS

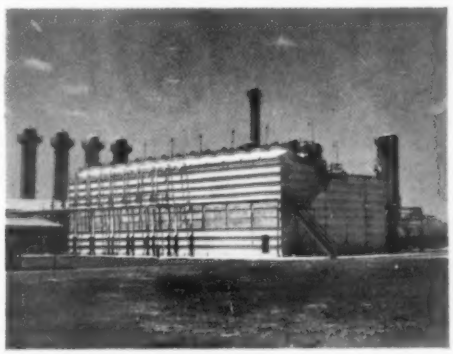
Presently installed cooling towers may be used as the basis for Combin-aire cooling by installing structure with fin-tube elements and fans immediately adjacent to the cooling tower with air for the fin-tube elements being drawn across the water near the bottom of the cooling tower, thus increasing the capacity of the cooling tower, and cooling the air for use in the fin-tube elements.



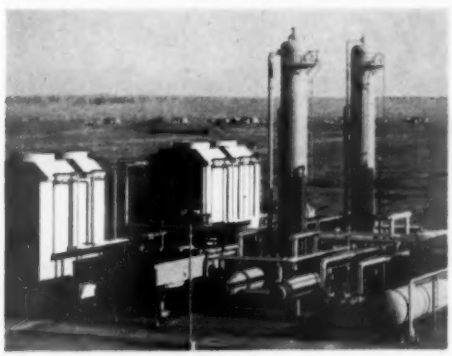
Combin-aire is protected by U. S. Patents, Patents pending and copyrights.



TEXAS —
COSDEN PETROLEUM CORPORATION
Big Spring, Texas



MEXICO —
PETROLEOS MEXICANOS
Reynosa, Tamaulipas, Mexico



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recent figures are not available, but indications are that sulfuric acid recovered by regeneration of acid sludge continues to increase.

Other acid recoveries are made by using spent acid in fertilizer production and by fortification in sulfuric acid contact plants. These latter two uses accounted for savings of about 1-million tons of 100% sulfuric acid in 1950, and about 1.2-million tons in 1956, Giusti reports.

U.S. sulfur production from refinery and natural gases (excluding hydrogen sulfide converted directly into sulfuric acid) has increased three-fold since 1950. This elemental sulfur now represents about 8% of total U.S. elemental sulfur production. This figure for the rest of the Free World is close to 17%. The following table shows Free World recovery of elemental sulfur from refinery and natural gases. These figures are comparable to the "Elemental Sulfur" and "Sulfur from Natural Gas" columns in the preceding table.

	Elemental sulfur from refinery gases long tons	*Elemental sulfur from natural gas, long tons*	*Total, long tons*
1950	75,000	135,000	210,000
1951	95,000	170,000	265,000
1952	145,000	245,000	390,000
1953	225,000	305,000	530,000
1954	265,000	320,000	585,000
1955	320,000	350,000	670,000
1956	390,000	370,000	760,000
1957	440,000	475,000	915,000

During the 1950 to 1957 period, sulfur recovery from natural gas increased 152%, and sulfur from refinery gas increased 960%. If hydrogen sulfide oxidized directly to sulfuric acid is included, however, the over-all refinery recovery of sulfur (and its equivalent in the oxidized hydrogen sulfide) increased only 440% during this period.

More hydrogen sulfide and air pollution problems have been mostly responsible for this increase in refinery sulfur recovery.

The primary causes for the increased hydrogen sulfide are increased runs to stills, greater throughput of high-sulfur crudes, and greater use of catalytic hydrodesulfurization processes.

Too Much Ammonia Now But a Bright Future

Some economists claim that it will take at least five years for the over-all demand for anhydrous ammonia to catch up with present supply. Yet, rapidly growing agricultural needs for nitrogen fertilizers make the long-term outlook good, according to a Phillips Petroleum Co. spokesman.

Estimated synthetic ammonia production capacity in the U.S. during 1958 is estimated at 13,194 tons a day. However, plants were operating at only about 75% of capacity to produce about 3,612,000 tons during 1958.

And, to complicate the supply-demand picture, additional capacity for 412 tons a day of anhydrous ammonia is under construction now, with 1,716 tons a day of capacity under consideration.

ANHYDROUS AMMONIA from this Canadian Industries, Ltd., plant at Millhaven, Ont., is used mostly for fertilizers.

Agriculture offers the biggest market for anhydrous ammonia and its fertilizer derivatives. And the growth potential is good, as very few farmers today use as much nitrogen as is recommended by agricultural experts. Our rapidly increasing population should eventually force farmers to use the maximum amounts of fertilizers of all kinds, including anhydrous ammonia, to provide the growing food and fiber needs of the U.S.

According to an estimate made by Chemical Week (a McGraw-Hill publication), 76% of 1957's anhydrous ammonia production was used agriculturally. Chemicals accounted for 7%; industrial explosives, 5%; synthetic fibers, 3%; and plastics, resins, etc., 3%. The remaining 6% was used for pulp and paper, metallurgy, petroleum refining, and other uses.

Phillips Petroleum believes that the demand for anhydrous ammonia in agriculture will increase an estimated 10% a year through 1960. The other uses of anhydrous ammonia should increase also, though probably not so rapidly.

Other fertilizer materials made from anhydrous ammonia reduce the over-all anhydrous ammonia supply. In the 1956-1957 fertilizer fiscal year, 245,878 tons of nitrogen solutions were used as fertilizers, an increase of 125% over the preceding fiscal period. Urea use was up 18%, aqua ammonia gained 23%, ammonium sulfate for direct application was up nearly 25%, and ammonium nitrate increased 17.5%.

On the other hand, coke-oven or byproduct ammonium sulfate, sodium nitrate, and imports of all types of nitrogenous fertilizer materials are in direct competition with synthetic ammonia or its derivatives.

On the negative side of the picture is an increase in foreign production of ammonium sulfate, cutting into the U.S. export market. These exports have been large since World War II. A reduction in the amount of ammonium

continued ▸

sulfate exports will make more synthetic anhydrous ammonia available on the U.S. market.

Ammonium nitrate—made from ammonia—is attracting considerable attention today as a non-agricultural use of anhydrous ammonia. This material is used as an ingredient of a relatively inexpensive explosive for open pit coal mining, quarry blasting, and other applications.

Practically all synthetic anhydrous ammonia plants now operating in this country use a petroleum derivative as a raw material. It may be natural gas, hydrogen from catalytic reforming, or even fuel oil. The ease of handling these raw materials makes them all preferred to coal.

Enough Styrene Capacity Until 1960

Expansion of U.S. styrene manufacturing facilities seems to have slowed. In fact, not until 1960 or later is styrene demand expected to equal present production capacity, according to E. K. Stilbert, manager of coating materials in the plastics department of Dow Chemical Co.

Current U.S. styrene manufacturing capacity is now approximately 1.5-billion lb. a year. As shown by the following table, styrene demand in the U.S. is not expected to approach this capacity until after 1960.

	Millions of pounds			
	1956	1957	1958	1960
SBR (Styrene-Butadiene) Rubber	435	450	420	470
Molding Materials	485	470	480	550
Protective Coating Resins	130	140	140	150
All Other	90	105	130	100
Total	1,140	1,165	1,170	1,270

New capacity on stream in 1958 includes Odessa Styrene Co. at Odessa, Tex., with a reported capacity of 35-million lb. a year, a portion of which has been earmarked to General Tire & Rubber Co.'s adjacent synthetic rubber plant. Also during 1958, Dow reported an increase in styrene capacity at its Midland, Mich., location.

Almost 40% of the U.S. styrene has been going into synthetic rubber manufacture. However, synthetic rubber, as a market for styrene, will soon feel the effect of foreign plants now under construction.

During the past few years, synthetic rubber became an important world commodity supplied principally by the U.S. (table, p. 66). This in turn has had an important bearing on the U.S. styrene market. However, announced plans for styrene-butadiene synthetic rubber plants in other parts of the world will reduce significantly the available market for U.S. synthetic rubber, thereby reducing the amount of styrene sold for this purpose, says Stilbert.

In a few instances, completion of the foreign rubber plants in advance of the styrene and/or butadiene plants will temporarily improve the volume of exports of these products from the U.S.

New developments in the rubber industry are not expected to affect seriously the volume of styrene used for styrene-butadiene rubber. While the development of new types of rubbers continues to make news, most of them either modify or replace natural rubber. These are not considered to be in competition with styrene-butadiene rubber.

Urethane foams, however, will have some affect on the use of styrene. These foams are making a major impact on the 1958 foam rubber market, and will make even more significant inroads in 1959. However, since most non-urethane foams are mainly natural rubber latex, modified by a portion of styrene-butadiene rubber, natural rubber latex will feel the greatest impact from urethane foams.

New developments in the polymer field, such as high-density polyethylene and polypropylene, are reported to be making inroads in polystyrene markets. In certain markets this is true, Stilbert concedes, but continues to point out that property and fabrication differences between these new polymers and polystyrene are great enough to prevent much penetration into the volume polystyrene markets.

It appears that much of the market limitation for polystyrene has been in the standard grades. New developments in polystyrene foams and improved molding resins with better properties and broader utility are more than offsetting the effects of the newer plastics, according to Stilbert.

New producers in the polystyrene field are improving polystyrene's market position by forcing tight price competition.

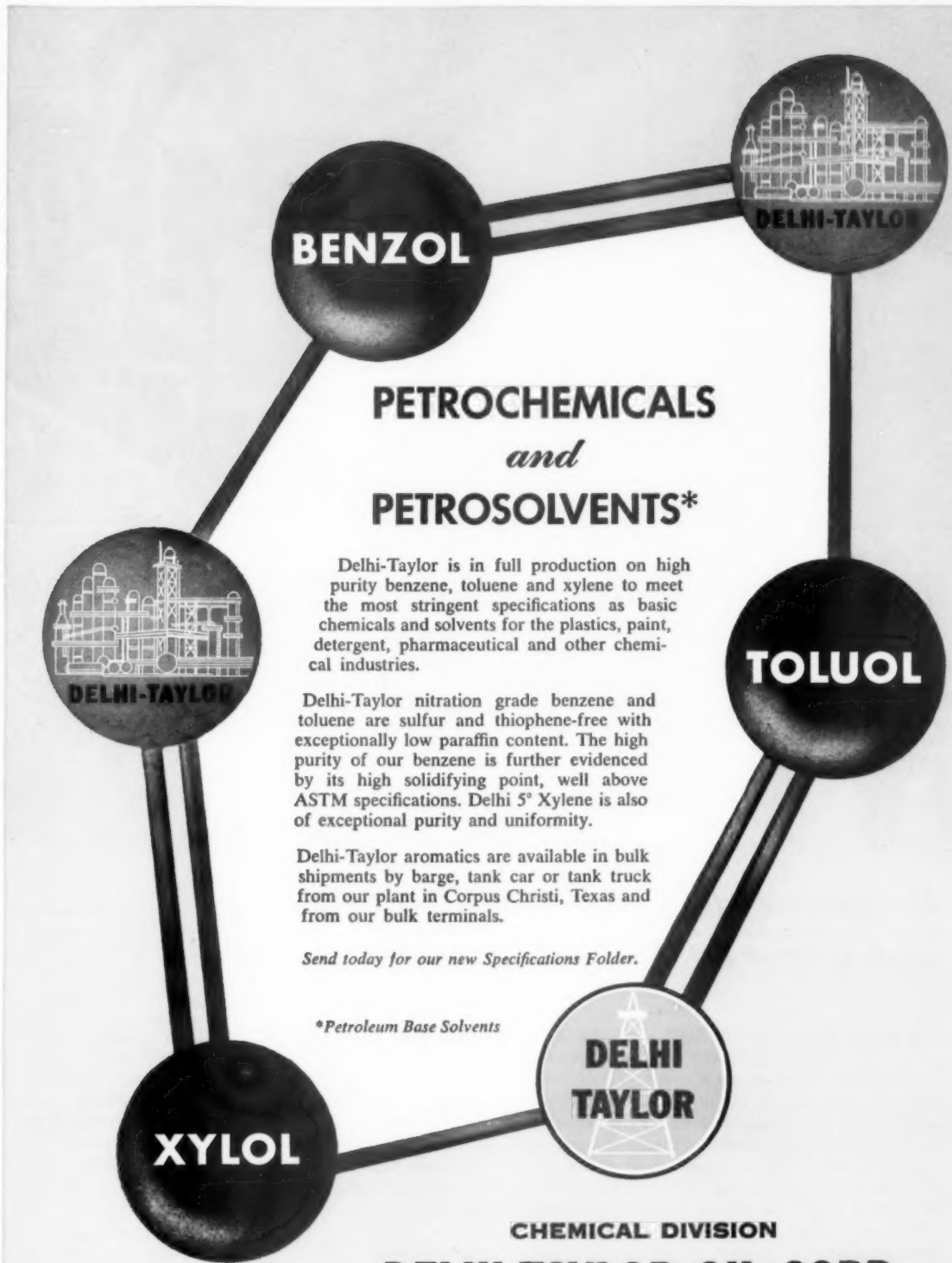
Cosden Petroleum Corp. has started production at a 20-million-lb.-a-year polystyrene plant at Big Spring, Tex. Granada Plastics has also announced plans to become a polystyrene producer somewhere in California.

Continued, but modest, growth is expected for styrene in the coatings field. Polyester resins and styrene copolymer coating resins continue to grow in volume. But part of this growth is now taking place in vinyl toluene (methyl styrene), which replaces styrene for many coatings uses because it gives improved properties to the resins.

continued ▸

"Expansion of U.S. styrene manufacturing facilities seems to have slowed. Styrene demand is not expected to approach current capacity until after 1960."

E. K. STILBERT, *manager of coating materials, plastics department,* Dow Chemical Co., Midland, Mich.



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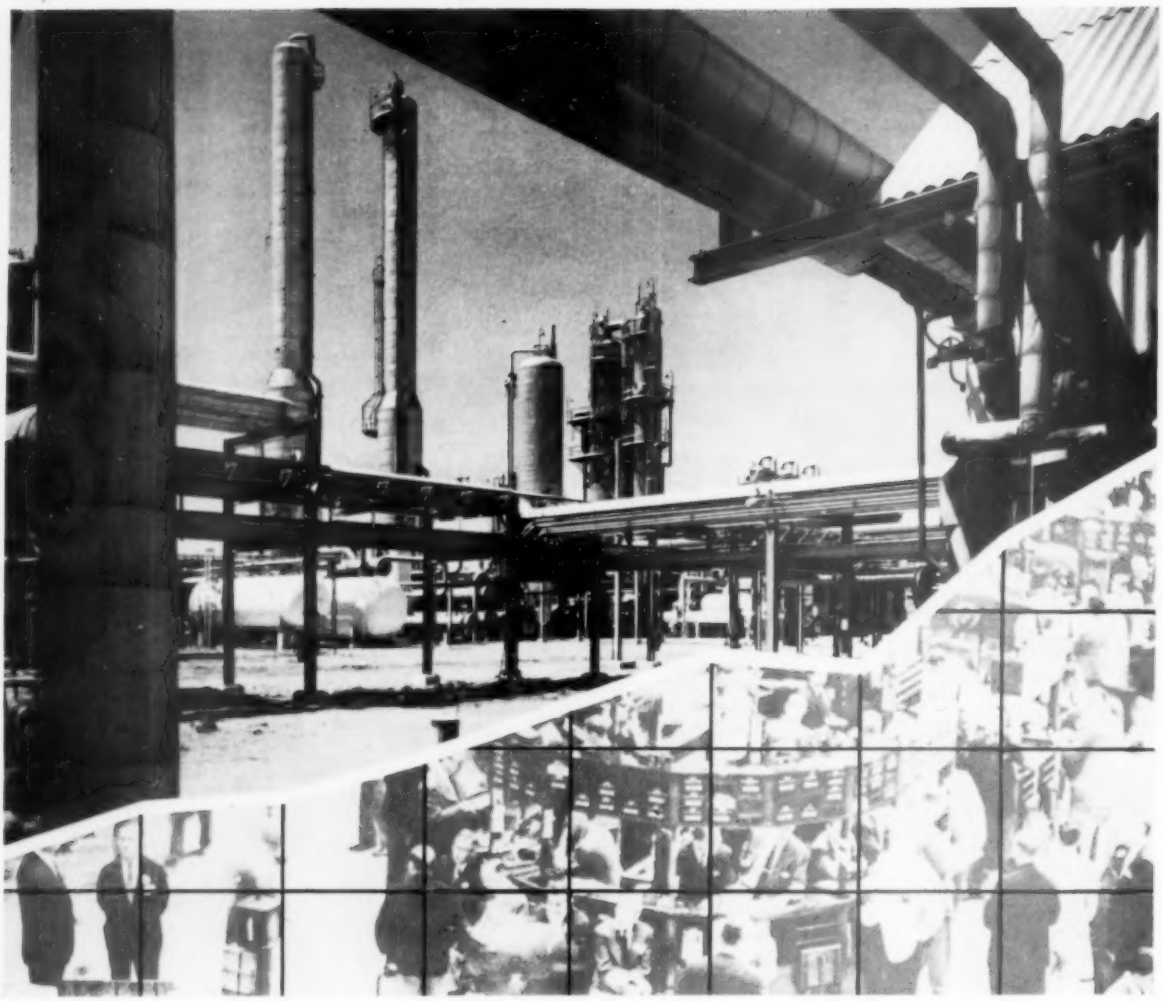

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Volume production of vinyl toluene is relatively small when compared with total styrene production, but has a significant effect on the volume of styrene used in the coatings field. Dow and American Cyanamid Co. are the only U.S. producers of vinyl toluene.

Exports are a significant portion of "other uses" for styrene, and these are expected to start falling off after 1959. Until 1955, exports of styrene were too small to be significant. Now, they have grown to over 80-million lb. a year.

The volume of styrene exports should reach a peak in 1959, and fall off thereafter due to completion of styrene plants in Europe and Japan.

Too Much Polyolefins But Prospects Bright

Polyethylene demand should catch up with production capacity by 1960 to 1962, as long as no more production capacity other than that announced to date is made available, according to A. F. Sward, manager of market research for Bakelite Co.

Much of the excess capacity today is for the so-called linear or high-density polyethylenes, with a total production potential of 310-million lb. a year. The older, established low-density polyethylenes are being consumed at about 90% of rated capacity today.

Linear polyethylene is now faced with the same capacity-versus-demand dilemma met by low-density polyethylene a decade ago when first released from government control. For over a year, supply was considerably ahead of demand.

Then the years of development and research work and the intense market development activity began to change the picture. Just as the unique properties of the low-density materials were exploited, Sward emphasizes that aggressive market development is needed for the newer linear polyethylene.

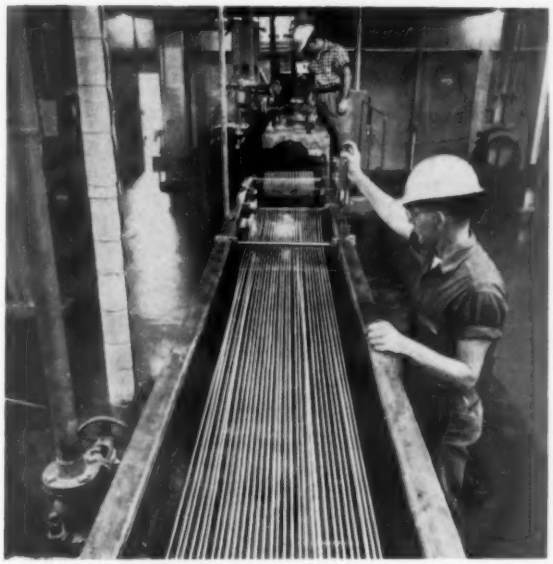
The big factor back of the over-capacity situation for polyolefins in general (low-density and linear polyethylene and polypropylene) is that market and manufacturing facilities for them have grown at a faster rate than for any other plastic produced in the past.

In the past, one or two producers at the most would enter a new material on the market. Sufficient time was allowed to develop markets for these products. In the case of linear polyethylene, the race to put capacity on stream has magnified what could be called "the normal product introductory supply-and-demand-imbalance" phase, Sward says.

End-use markets for polyolefins in 1958 continued their excellent past growth record. Their order of importance volumewise remains unchanged since 1957.

About 98% of domestic polyolefin sales are accounted for by the following markets (listed in order of importance): packaging film, injection and blow molding, coated wire, extruded pipe, and coatings.

Film for packaging remains the largest U.S. market for polyolefin resins, though rapid growth is anticipated in the agricultural, construction, and container liner markets



"RIGID" LINEAR POLYETHYLENE from Celanese Corp. of America's Houston (Tex.) plant is a versatile new plastic.

where heavier films than those used in packaging will be needed.

The film market provides an example of the competitive material picture. There never will be a universally ideal film, since different uses require different properties making the term "universality" a contradiction.

There are no new materials at present, however, that have the versatility and cost advantage of the polyolefins used by the film industry. Competing materials in development stages have specific properties for certain packaging uses only, says Sward.

A very large growth is predicted for polyolefins used in injection and blow molding, which cover a very broad market serving many industries.

Interplay between the various polyolefins, to find the best suited for a given use, can be expected in the injection molding market. This search for optimum property balance will ultimately ensure the use of the proper type of polyolefin for any given end product.

Containers for packaging, including squeeze bottles, are important products made by blow molding. Here again, the broader range of temperature properties now available in polyolefins opens this market to sterilizable containers.

Markets for polyolefins as wire coating for insulation, their first important use, have bright growth prospects, Sward says. Important factor in these prospects is the intensive research and development work done for wire and cable insulation in terms of product development.

The new oil-filled polyethylene power cable for direct ground burial under concrete is a prime example of proper utilization of chemical and electrical properties in combination with the economics offered by polyethylene.

Prospects for polyolefins in the pipe market are viewed with optimism because of their increasing acceptance by

continued ▸

building codes throughout the country in recent years. However, a distinct liability still pervades this market in the form of pipe produced from reprocessed material rather than virgin polyolefins. In this respect, Sward says, the National Sanitation Foundation made a major step forward when it approved the use of its seal to identify pipe made exclusively of virgin polyethylene.

The effects of the more recent polyolefin developments (medium-density polyethylene, linear polyethylene, and polypropylene) on the over-all market are yet to be learned.

These newer materials, compared to low-density polyethylene, have broader ranges of properties in terms of greater stiffness, hardness, temperature limits, and permeability. But, they have not been tested to the extremes of their capabilities yet, as attainment of correct property balances is an intricate science.

Outstanding among the polyolefins are developments in polypropylene. Eastman Kodak Co. is the latest company to stake a claim in the field, with an announcement that it has a new polypropylene process based on its own catalyst system (PW—Sep.12'58,p36). Though Eastman has made no plant construction announcements, it does plan commercial production of polypropylene eventually, after completing its own evaluation of polypropylene product from the Longview (Tex.) pilot plant of its subsidiary, Texas Eastman Co.

The Eastman announcement followed by only two weeks another major polypropylene announcement—Humble Oil & Refining Co.'s plans to build a 40-million-lb.-a-year polypropylene plant at Baytown, Tex. (PW—Aug.22 '58,p10). The Humble process is based on Esso Research & Engineering Co. work with Ziegler catalysts (PW—Aug.29'58,p13). Enjay Co. and Spencer Chemical Co. will market Humble's polypropylene product.

Thus, Humble and Eastman will enter a market now served by only one U.S. producer, Hercules Power Co., which has a 20-million-lb.-a-year plant at Parlin, N. J. (PW—Dec.6'57,p16).

The developmental work presently underway serves as the guide for proper market selections. Though a time-consuming guide on occasion, it is one that pays for itself in the avoidance of costly mistakes and bad will from customers.

Petroleum, as a source of raw materials for polyolefins, has so many economic advantages over other raw material sources, that it will remain on top of the raw materials pile for many years to come, Sward predicts.

Petroleum-derived materials can be processed to give the desired olefin monomer in adequate quantities both economically and easily compared to any other source of materials.

Petrochemical Acids Continue in Demand

Terephthalic acid, made by the oxidation of paraxylene, is by far the largest volume aromatic acid derived from petroleum sources, and appears to have the best growth potential of all the petrochemical aromatic acids, according to John J. O'Connell, vice-president-marketing, of Amoco Chemicals Corp. The principal use for terephthalic acid is in the manufacture of saturated polyesters, which are ultimately processed into fiber, such as Du Pont's Dacron, and film, such as Du Pont's Mylar.

Terephthalic acid is typically converted into dimethyl terephthalate through esterification. This dimethyl terephthalate, or DMT, is then used in the manufacture of saturated polyesters. A very minor portion of the DMT goes into specialty surface coatings, such as wire enamels, and high-temperature alkyd resins.

Du Pont is believed to be the nation's largest producer and consumer of terephthalic acid and its derivative, dimethyl terephthalate. Hercules Powder Co. produces the latter material, and late this year Amoco Chemicals Corp. will become a producer of both materials.

Du Pont apparently supplies their own requirements for terephthalic acid, according to O'Connell. Hercules is believed to produce DMT directly from paraxylene without having to make terephthalic acid as an intermediate step.

Oronite Chemical Co., subsidiary of Standard Oil Co. (Calif)., is reported to have sampled the trade with terephthalic acid. And late this year, Amoco Chemicals will have its Joliet (Ill.) plant in operation making terephthalic acid, among other petrochemical acids, by the liquid-phase oxidation of mixed (ortho-, meta, and para-) xylenes. The plant will also make DMT.

Though terephthalic acid and dimethyl terephthalate appear to be in ample supply in the immediate future, this is a rapidly growing field which should consume additional quantities of petroleum xylenes in coming years, says O'Connell.

One new development, which could have considerable future impact on terephthalic acid manufacture centers around the possibility of direct combination (by chemical condensation reaction) of the acid with glycols to give low-cost polymers.

Phthalic anhydride and isophthalic acid, next to terephthalic acid in importance among aromatic acids

continued ▸

"New acids are on the horizon which appear to have some possibility of aiding the continued growth of petrochemicals in the aromatic acids field."

J. J. O'Connell, *vice-president—marketing,*
Amoco Chemicals Corp., Chicago, Ill.

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derived from petroleum sources, will increase during the next few years—but at a decreased rate, O'Connell predicts.

Oronite Chemical is the only current producer of phthalic anhydride from petroleum orthoxylene—all other production being from coal-tar naphthalene. Oronite also makes isophthalic acid by oxidation of metaxylene. Amoco Chemicals will be the second company to produce phthalic anhydride and isophthalic acid from xylenes when its Joliet plant goes on stream.

Both phthalic anhydride and isophthalic acid are used in the same markets by the same customers and are made by the same producers, hence are considered together in market analyses.

Alkyd resins account for the lion's share of consumption for these two materials, with plasticizers next in size and still enjoying a healthy growth rate. Their use in unsaturated polyesters is growing rapidly, but the effect on the total market picture is small.

The net result is that the growth rate for phthalic anhydride and phthalic acid production will probably be less than half the 9% year growth in this field through the 1940's.

At present, there are eight producers of phthalic anhydride, plus two additional firms who have plants under construction. When these plants are completed, the present demand for isophthalic acid and phthalic anhydride will use less than 60% of the total available production capacity in this country.

However, the entry of isophthalic acid into new fields —outside house paints and saturated polyester polymers —could have a significant influence on the market. The combined market for isophthalic acid and phthalic anhydride in these two fields could well exceed the historical phthalic anhydride consumption alone in them.

Another development, according to O'Connell, is Amoco Chemicals' recent announcement that isophthalic acid from its Joliet plant will be priced so as to make it competitive with phthalic anhydride in alkyd resin manufacture.

Benzoic acid, another aromatic acid derived to some extent from petroleum sources, will become increasingly petrochemical in the future.

This material is made by a number of producers, including Monsanto Chemical Co., Tennessee Products & Chemical Co., Hooker Chemical Corp., Heyden Newport Chemical Corp., and Benzol Products Co.

Again, Amoco Chemicals will become a producer of benzoic acid in late 1958. Oronite Chemical announced in 1956 that they were planning to offer benzoic as a byproduct of its isophthalic acid operation in the future. Thus, it appears that increased amounts of benzoic acid will be derived from petroleum sources in the future.

Major applications for this material are as a preservative in the form of USP sodium benzoate, as a plasticizer in the form of dipropylene glycol dibenzoates, and as an alkyd resin modifier in the form of technical benzoic acid.

Maleic anhydride can be derived from coal-tar naphthalene or benzene (petroleum or coal-tar). The selection of the starting material depends on the price and availability.

Monsanto Chemical Co., American Cyanamid Co., Allied Chemical Corp., and Reichhold Chemicals Co. are among the major U. S. maleic anhydride producers.

One commercial application of maleic anhydride is the production of fumaric acid by the hydration and isomerization of maleic anhydride.

In addition to the major aromatic acids, there is an increasing number of exotic new aromatic acids, derived from petroleum, which may become major chemicals some time in the future, according to O'Connell.

For example, Du Pont has pyromellitic anhydride which can be made by the oxidation of durene, a petroleum derivative. Hooker Chemical and Velsicol Chemical Corp. make chlorendic anhydride, believed to use pentane as a starting material. Amoco Chemicals is doing development work on a new tri-functional acid, called trimellitic anhydride, which can be produced by the oxidation of trialkyl benzenes.

All of these acids are expected to find increasing usage in polyesters, alkyds, and other polymers. Their combined volume is not large, but they will probably grow, increasing the penetration of petrochemicals in the aromatic acid field.

New Uses, New Types Cheer Rubber's Future

Synthetic rubber production and consumption in the U. S. still closely parallels the market vigor of the largest rubber consumer—automobiles. However, new types and increasing non-tire uses are adding stability to the industry.

Total rubber consumption, both new synthetic and new natural, will show an estimated 11.4% drop from 1957 figures in 1958, although synthetic will drop only 7.7%, according to C. F. Ruebensaal, director of commercial planning for Texas-U. S. Chemical Co. As is shown by the following table, this follows a drop in automotive sales in 1958.

Year	Automobile Sales		Total U. S. New Rubber Consumption	
	Units	% change from preceding year	Long tons (thousands)	% change from preceding year
1954	5,535,000	— 3.6	1,233	— 7.6
1955	7,170,000	+29.5	1,530	+24.1
1956	5,955,000	—16.9	1,436	— 6.1
1957	5,982,000	+ 0.5	1,468	+ 2.2
1958 (est.)	4,600,000	—23.1	1,300	—11.4

As the currently depressed automobile sales are expected to increase steadily, starting with the 1959 models, the rubber industry is expected to grow also. It may exceed the 1.7-million long ton mark by the early 1960's, says Ruebensaal.

Car makers predict that their total sales will rise to 5.5-million cars in 1959, compared with an estimated 4.6-million in 1958. They further feel that annual sales will exceed 6-million from 1960 on.

Based on these predictions, total new synthetic and natural rubber consumption in the U. S. in 1959 can be expected to exceed the 1.5-million long ton level (reached only once before, in banner-year 1955), and continue to grow at approximately 4% a year, to exceed 1.7-million long tons a year in the early 1960's.

Synthetic rubber will capture an ever-increasing pro-

continued ▸

Exports and Rising Use Stabilize U.S. Synthetic Rubber Output

	U. S. Synthetic Consumption			Synthetic Exports	U. S. Synthetic Consumption and Exports	
	long tons	% of total new rubber	% change from preceding year	long tons	consumption & exports, long tons	% change from preceding year
1954	636,000	51.6	—19.0	30,000	666,000	—17.3
1955	895,000	58.5	+40.8	94,000	989,000	+48.5
1956	874,000	60.8	+ 2.3	149,000	1,023,000	+ 3.4
1957	926,000	63.2	+ 6.0	203,000	1,129,000	+10.4
1958 (est.)	837,000	64.5	— 9.6	205,000	1,042,000	— 7.7

portion of the total rubber market, from an estimated 64.5% in 1958 to about 70% in the early 1960's. Improved quality and new types and uses will account for most of this growth.

Synthetic's share of total rubber used domestically has increased steadily over the years, as shown in the accompanying table. Constant development of new types of rubbers, improvement of existing synthetics, and intensified market development are the keystones to increased acceptance of synthetic rubber. About 80% of the synthetic rubber produced in the U.S. today is the butadiene-styrene type.

The so-called "synthetic natural" rubbers, which could replace all or most natural rubber in truck tires, are examples of new developments in the field.

These rubbers, polyisoprene and cis-polybutadiene, are not likely to replace natural rubber immediately, however. Today, they are in much the same position as was the now much-used butadiene-styrene rubber at the end of World War II—good, but needing further process development to improve quality and reduce costs.

If merely half of the natural rubber now used in tires were replaced by synthetic rubber, the latter's share of all rubber usage would be almost 80%.

Synthetic rubbers will continue to improve, thus winning back some markets from plastics and developing new markets both in combination with and in competition with plastics.

Improved color and stability and greater versatility from better and faster curing techniques will make synthetic rubbers more acceptable for more uses, according to Ruebensaal.

For example, there is now a sizable rubber tonnage used in plastic and paint outlets. Some of these more recent applications include butadiene-styrene rubbers blended with high styrene-butadiene resins, butadiene-acrylonitrile rubbers blended with styrene-acrylonitrile resins, and butadiene-styrene rubber latex combined with styrene resins to give high-impact molding compounds.

Intensified market development is already helping rubber to reduce its dependence upon the automotive and truck tire market. The non-tire segment of the total rubber market increased from 41% to 50% of the total dollar value of rubber products in the period from 1939 to 1954. Though more recent figures are not available, indications are that this trend is continuing at an even faster rate, according to Ruebensaal.

New volume markets being sought by rubber marketers include wheels for trains and subway cars, air springs for transportation uses, conveyors and belting, and rubber-asphalt paving for roadways and airport landing strips.

The recent development of collapsible, returnable shipping containers; temporary buildings in the form of air-supported structures; and the substitution of flexible rubber lines for other existing piping materials also offer new outlets for rubber and rubber-like materials. Synthetic rubbers in the form of latex should also find growing market outlets in the automotive, furniture, and industrial fields.

A slowdown in the export market, however, will counterbalance some of the rubber industry's U. S. growth in the next few years.

The fluctuation of synthetic rubber production in the U. S. has been partially offset in recent years by a rapid growth in foreign consumption—mostly imported from the U. S. However, foreign synthetic-rubber production capacity is growing rapidly, and will cut into exports from the U. S.

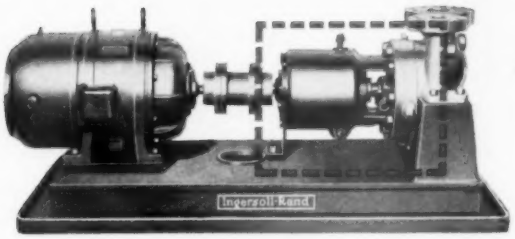
Free Europe's installed synthetic rubber capacity will be about 220,000 long tons a year by the end of 1958, and possibly 375,000 long tons a year by 1960. Information for the Russian and associated Eastern European plants is not accurate, but it is believed that 1958 will see them producing 450,000 long tons a year. Plans for 20 plants in Eastern Europe indicate a capacity increase of another 200,000 long tons a year by 1960.

Butadiene should continue as the major raw material

continued ▶

"Synthetic rubbers will continue to improve in color and stability, winning back some of their markets from plastics and developing new markets."

C. F. RUEBENSAAL, *director of commercial planning,*
Texas-U.S. Chemical Co., New York, N.Y.



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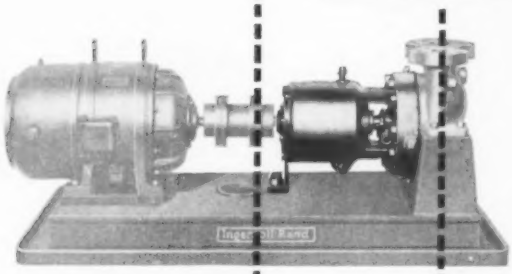

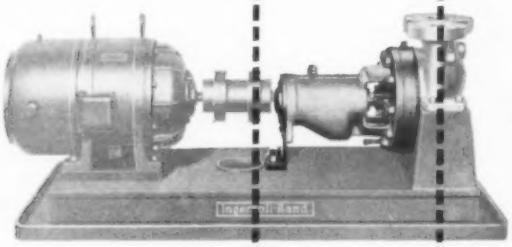

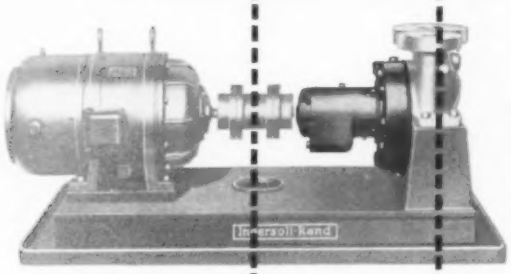

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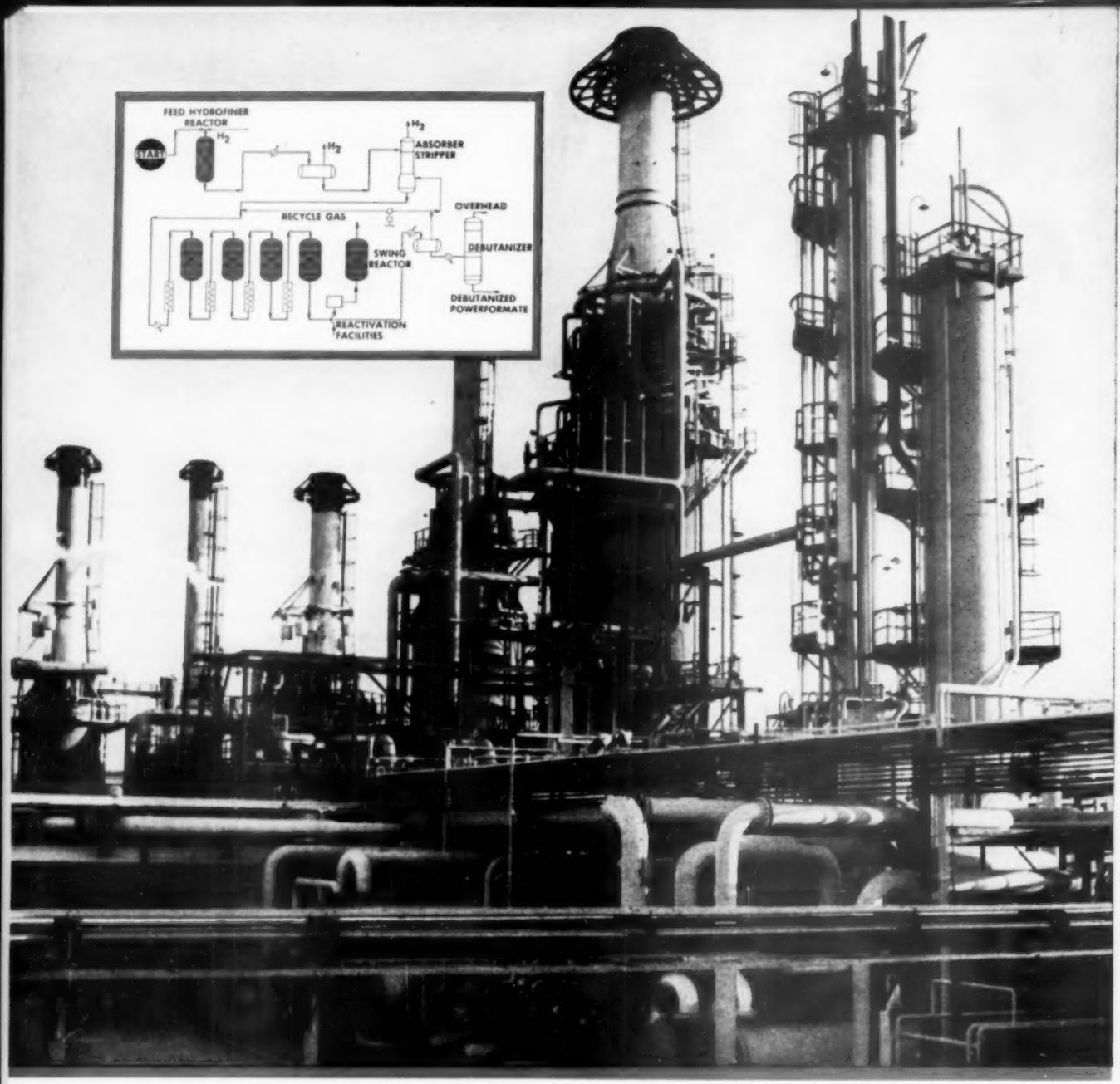

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for general-purpose synthetic rubbers, and expand its use in some of the small-scale specialty rubbers.

Capacity to make butadiene for synthetic-rubber demands and other chemical uses (rubber-based paints, Nylon, and isosebacic acid—less than 10% of total butadiene consumption) has cost about $150-million since private industry took over synthetic-rubber production from the government in 1955. This continued expansion brought butadiene capacity slightly in excess of consumption in 1956, and has increased steadily to where it appears capacity will exceed consumption by 50% by the end of this year, according to Ruebensaal.

Butadiene via butane dehydrogenation was only about 15% of the total petroleum-butadiene plant capacity sold by the government. The remaining butadiene capacity included 75% from butylenes and 10% from petroleum by-product gases.

A large percentage of the new planned capacity is from butane which will constitute about one-half of the total butadiene capacity of 1¼-million short tons anticipated by 1960, Ruebensaal says.

The Surfactant Market Is Healthy, Growing

Surfactants—synthetic detergents, emulsifiers, and wetting agents—have had an average production increase of about 100-million lb. a year over the last five years. This may be expected to continue for the next few years, partly because of population increases, and partly because of new industrial uses, according to Foster Dee Snell, president of Foster D. Snell, Inc., consulting chemists and chemical engineers.

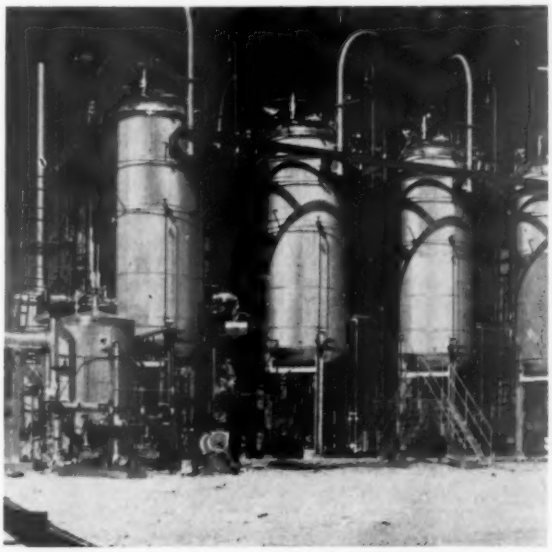
Syndets (synthetic detergents) continue to replace soaps. Syndets are now 72% of the combined total tonnage of the syndet-soap market, according to figures of the Assn. of American Soap and Glycerine Producers. Five years ago, syndets were only 54% of the combined total syndet-soap tonnage.

In the first quarter of 1958, little change in this percentage occurred. Soap sales went up 0.1% from the previous quarter, syndet sales up 1%. However, on comparing the first quarter results of 1958 with those of the first quarter results of 1957, soap sales were down 15%, syndet sales down 3%. Early sales in 1958, however, were lower than usual, while those in early 1957 were definitely higher than usual.

Petroleum fractions continue to be a major raw material for making surfactants such as sodium dodecyl benzene sulfonate and the various so-called "anionics."

The product in greatest production is the anionic sodium dodecyl benzene sulfonate. The dodecyl group is tetrapropylene which gives the desired chain length for the alkyl group. Of the benzene portion, more than half is obtained from coke ovens, most of the rest from petroleum. A minor amount is imported.

This raw material supply picture may turn more in favor of petroleum as more refining companies go into benzene production. For example, Humble Oil & Refining Co. has recently completed a 30-million-gal.-a-day benzene plant at Baytown, Tex. In general, the standard for surfactants manufacture is set by benzene derived from petroleum.



STYRENE AND BUTADIENE are reacted at General Tire & Rubber Co.'s Odessa (Tex.) plant to make SBR synthetic rubber.

The so-called "nonionic" surfactants, serious and upcoming competitors of the "anionics," are also mostly petroleum-derived, though some natural materials, such as tallow, also threaten the "anionics" market, according to Snell.

Nonionics find many uses in industry because of their chemical stability. They are compatible with either anionics or cationics, though the latter two cannot be used together because they precipitate one another when in solution.

One type of nonionic in relatively large production is a chemical condensation product of several molecules of ethylene oxide with nonyl phenol.

Low-cost tallow, converted into a tallow-alcohol sulfate is another rival of the anionics. Fatty-acid sugar esters are another source of low-cost nonionics. However, as yet, only the oil-soluble form is commercial. When the water-soluble type—the monoester—reaches large-scale production, it too may become a rival of the present lowest cost syndet, the dodecyl benzene sulfonate.

The headstart by dodecyl benzene sulfonate in low-cost raw materials and an accumulation of production experience has kept it the major ingredient in the synthetic detergent market, even though it has fallen from a one-time high of 80% of all synthetic detergents to about 50% today.

Large producers are now sulfonating in a continuous process with anhydrous sulfur trioxide. The alkylate, the dodecyl benzene part, is supplied to small producers who sulfonate by the batch process, a comparatively easy step.

Household detergents still consume the major part of dodecyl bezene sulfonate production. However, this is largely on a cost basis. When and if straight-chain alcohol sulfates are produced at the same price, they can be expected to offer sharp competition for dodecyl benzene sulfonate.

continued ▸

Another market for dodecyl benzene alkylate is more than 100-million lb. a year of exports. These exports may be expected to increase, says Snell.

Adding to the general health of the surfactant market is the fact that more and more types of industries are finding advantages in their use.

Fertilizers take effect more quickly if accompanied by a small proportion of surfactant. Agricultural sprays have contained a surfactant for some time, to increase the ease of wetting and spreading of an aqueous spray on leaves. Secondary oil recovery is promoted in the presence of a surfactant. And many other applications exist in textile processing, washing of food, cosmetics, pharmaceuticals, and the paper industry.

Urethane Markets Are Growing Rapidly

Urethane foams, relatively new to the U. S., are finding growing acceptance by industry and consumer. The result is a spectacular annual sales growth record from only 10-million lb. in 1956 to a possible 100-million lb. in 1960.

These foams were hardly known in the U. S. until 1954. Market acceptance was slow at first, with 1956 the first really encouraging year. In 1957 sales had grown to about 25-million. For 1958, J. D. Mahoney, director of marketing for Mobay Chemical Co., estimates the market will be 45-million, increasing to 100-million by 1960.

Urethane rubbers, however, have yet to gain the acceptance now accorded to the foams. But a number of attractive physical properties indicate a bright future.

In 1957, about the most concrete statement that would be made about urethane rubbers was that they were being studied. However, as the result of continued process and market research, approaching the $500,000-a-month figure, urethane rubber is now ready for commercial non-tire applications. Mobay's Mahoney sees a 1959 market of 750,000 lb. for urethane rubber, and a 1960 market of 2-million to 4-million lb.

The chemical basis for the urethanes is the reaction of a polyester or polyether with an isocyanate—any one of which can be of petrochemical origin.

In the case of the foams, propylene glycol is reacted with an isocyanate. Or with the newer type foams, propylene polyether is reacted with a diisocyanate—the latter requiring toluene, a potential petrochemical. Adipic acid (also a possible petrochemical) polyesters are also used in the manufacture of urethane foams.

FLEXIBLE URETHANE FOAMS are replacing natural rubber latex as cushioning for furniture and automobile seats.

The major markets for the urethane foams are in the cushioning and, potentially, construction fields. The flexible foams have the property of absorbing or cushioning a shock without giving the feeling of "bounce-back." The rigid foams are good insulators and have considerable compression and tensile strengths. Both types have the unusual property of "foaming-in-place" to expand as much as 30 times when the reactants and catalyst are mixed.

Cushioning in the automotive and furniture fields accounts for most of the flexible foam market. Other applications include rug underlays, shoulder pads, mattress topper pads, sponges, clothing interlining, industrial packaging, and thermal and acoustical insulation.

Rigid foams have a more limited market than their bouncy cousins, but appear to have a good growth potential as low-temperature insulation materials and in "sandwich-type" insulated construction panels.

Urethane rubbers are currently undergoing tests in automotive tires by most major tire-makers. However, much more development work, testing, and economic study is needed before they are applied commercially in tires. The outstanding property of urethane rubber as a tire material is its ability to outwear ordinary rubber, lasting eight to ten times as long.

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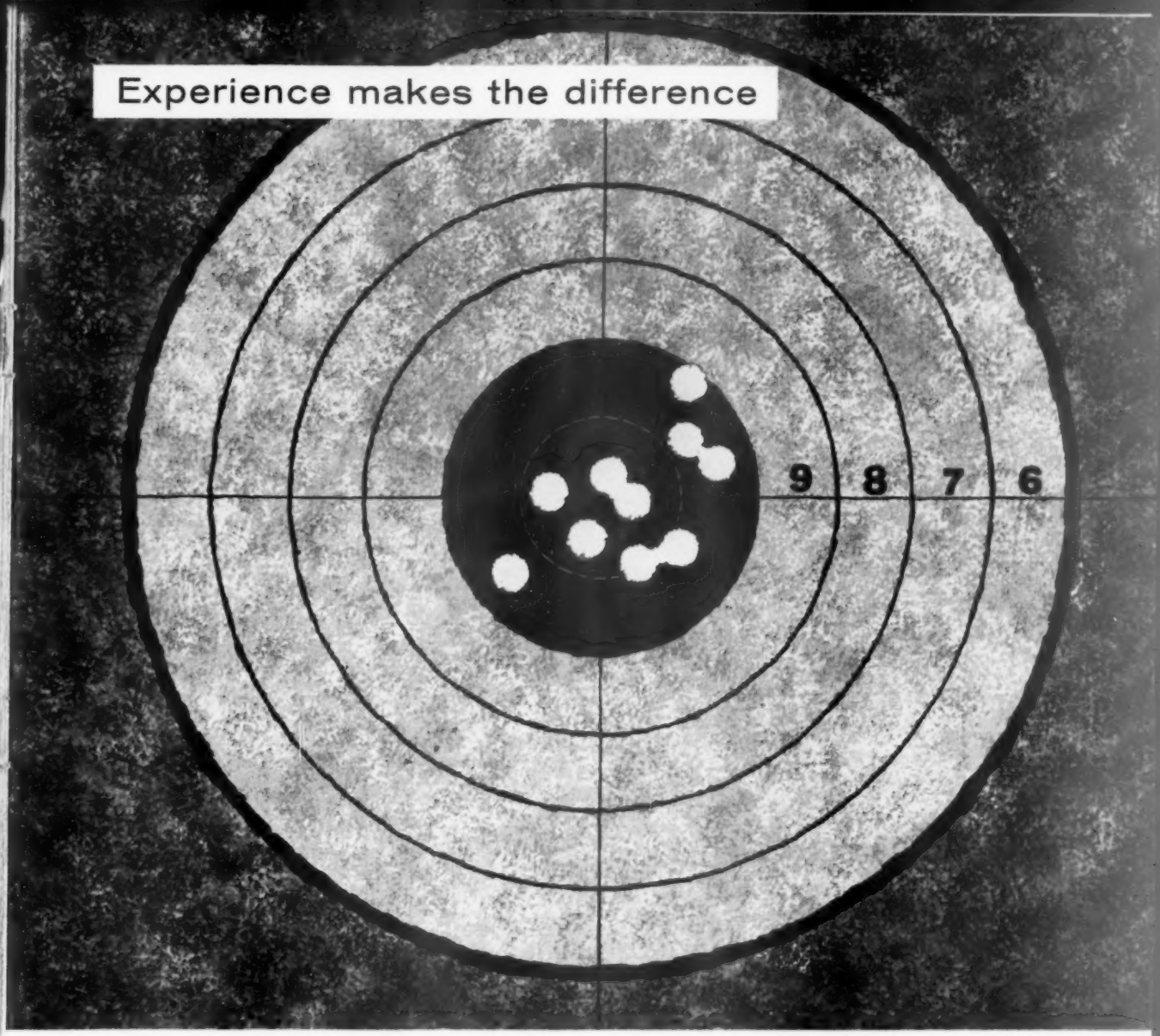

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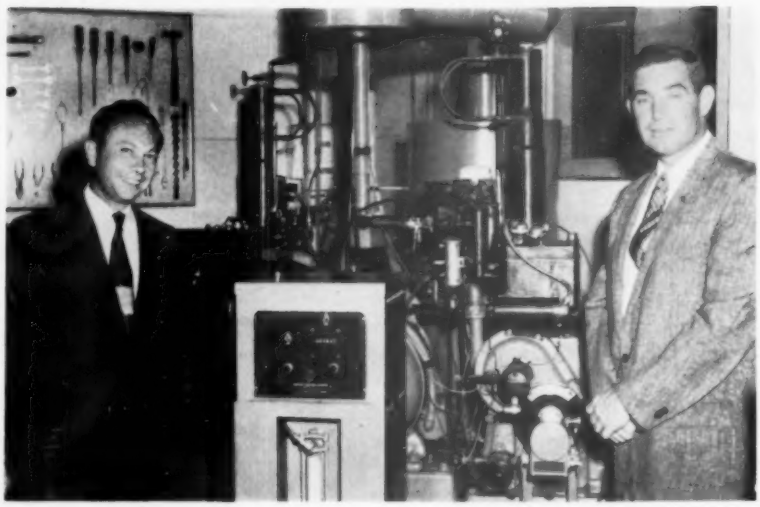

CITIES SERVICE RESEARCHERS W. C. Bradbury (left) and J. C. Porter, inventors of the company's new "5-D Anti-Rumble Gasolene," inspect one of the instrumented test engines used in its development. Here is the story of . . .

How CS Licked Rumble

"Within a year every major oil company will incorporate rumble protection in their motor fuels as Cities Service has already done," predicts a spokesman at Cities Service Research & Development Corp.'s Cranbury (N.J.) laboratories.

Cities Service Oil Co. was the first to make public announcement of a commercial fuel composition aimed specifically at the prevention of rumble (PW—Jul.25'58,p39). The company's confidence that other oil companies will follow suit grows out of anticipated increases in compression ratios in new car models.

The primary feature of Cities Service's "antirumble fuel composition" is a new phosphorous-containing additive invented at the company's Cranbury (N.J.) labs.

The exact details of the additive's composition cannot be released until the company has obtained full patent coverage. However, the additive has a chemical composition differing from any other phosphorous-containing gasoline additive now on the market.

In addition to the use of an additive, the company has made some adjustments in the over-all composition of the fuel itself to enhance its rumble suppression properties.

Phosphorous additives reduce the incidence of rumble in high-compression engines by changing the properties of the combustion-chamber deposits.

The best information to date is that surface-induced ignition causes rumble, and that hot spots on combustion-chamber deposits cause surface-induced ignition.

The phosphorous in the additive apparently combines with the deposits and changes their thermal properties so that they will not glow and ignite the fuel-air mixture.

Rumble, and how to prevent it, began to worry the oil industry about three to four years ago.

The problem was how to furnish motor fuels to satisfy the ever increasing compression ratios being produced by the car makers. It was found that when compression ratios exceeded 9.5:1 by very much, a low-frequency knocking sound, called rumble, occurred (PW—Jun.27'58, p58).

Some of the cars now on the road with compression ratios of 9.5:1 or more will rumble under certain conditions. But rumble will become almost a certainty in the future, when compression ratios reach 11:1.

Some industry people say that they heard rumble 20 years ago in 7:1 compression-ratio engines. Apparently improvements in fuel compositions and engine designs delayed the onset of widespread rumble until now.

Three approaches toward rumble suppression have been studied by the oil and automotive industries—additives, fuel composition, and engine

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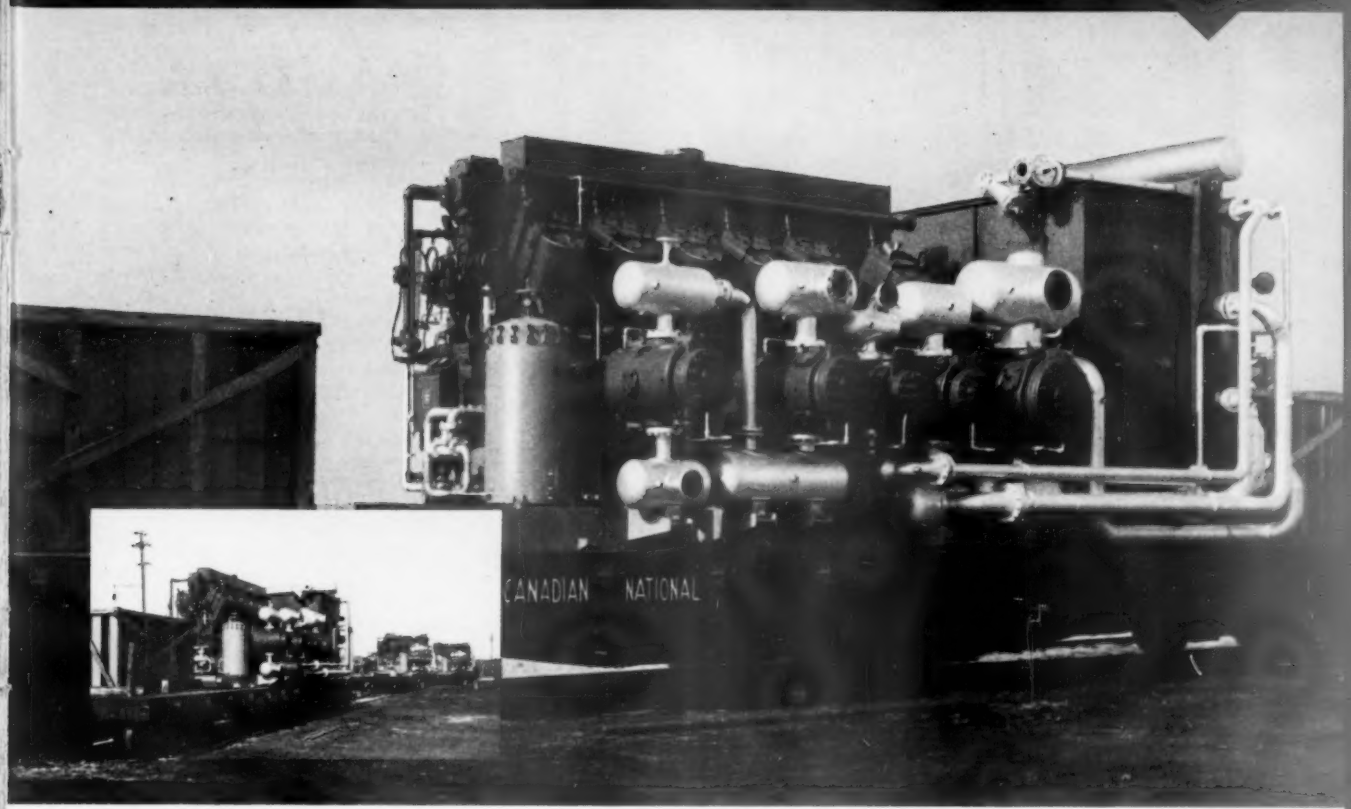

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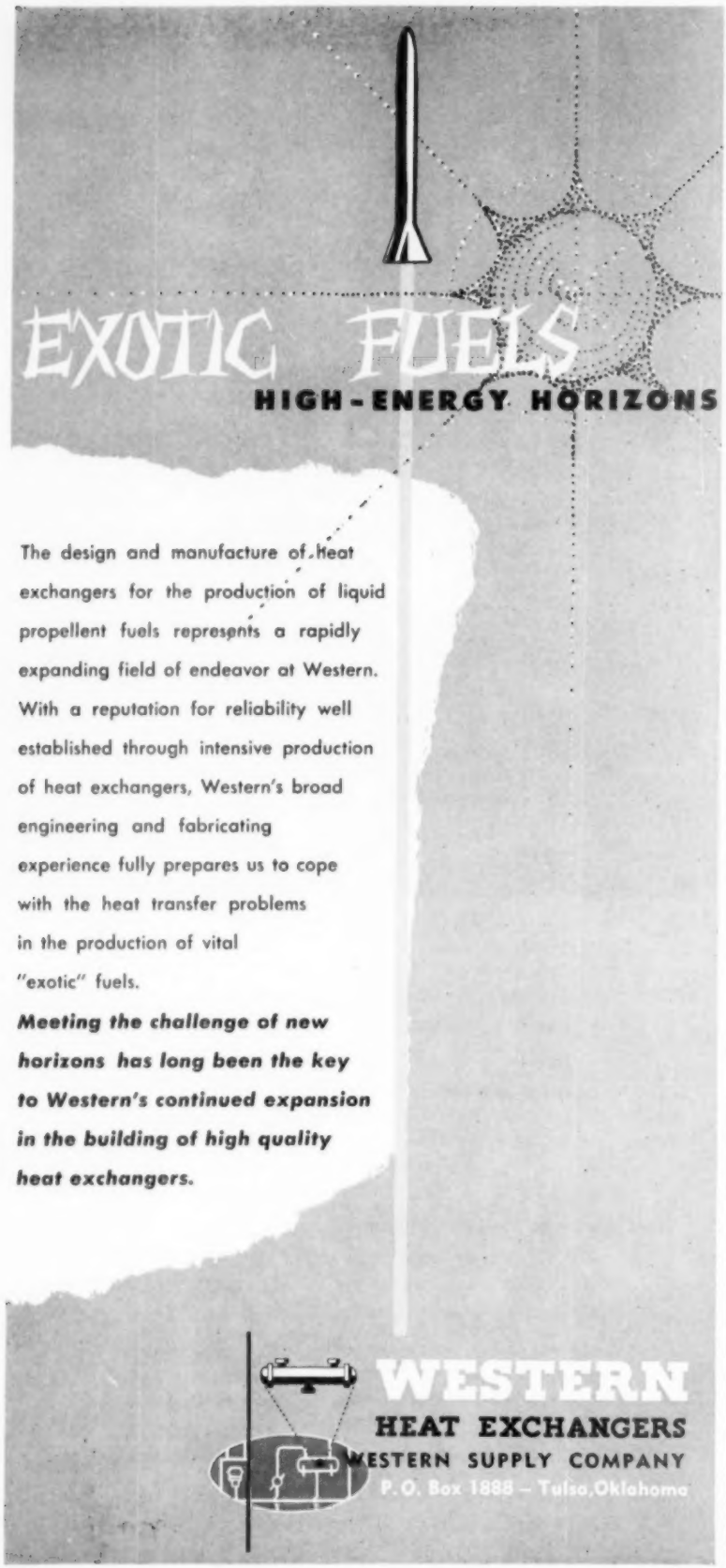
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design—with additives apparently offering the most attractive solution.

One industry spokesman says that at least 25 research organizations have been working on the rumble problem. At the June meeting of the Society of Automotive Engineers, in Atlantic City, several of these organizations reported that phosphorous-containing additives helped suppress rumble.

Substitution of paraffin hydrocarbons (such as alkylate and isomerate) for aromatics (from catalytic reformate) also helped reduce rumble. In fact, leaded benzene, with an octane rating of 115, is one of the worst rumblers—because of the type of combustion-chamber deposits it leaves when burned.

To date, changes in the design of engines and combustion chambers have had no great effect on rumble. And the consensus now is that rumble will not be stopped by such mechanical changes.

Currently, the additive route to rumble suppression is considered more attractive economically than changes in fuel composition.

"If you can find a dab of something to doctor the gasoline, and which doesn't cost too much, you're set," says a Cities Service researcher.

On the other hand, it is very difficult to change the basic composition of today's motor gasoline economically, because of the interrelation of all process streams in a modern refinery.

Cities Service began the study of gasoline additives in general about five years ago, and additives for rumble suppression about 18 months ago.

Right at the start of its additive research, the company made the decision that additives will have to be studied continuously."

In line with this program, the company began to investigate any and all materials that might give some "bonus" feature not found in the fuel without the additive.

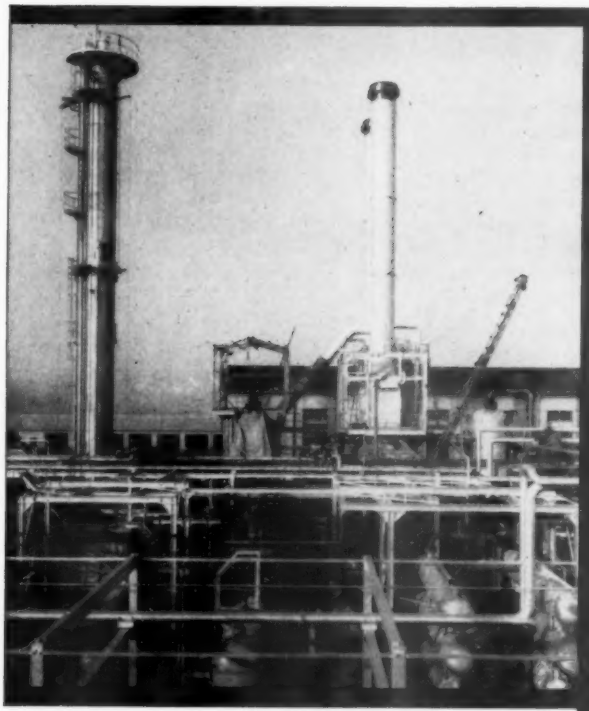
About 18 months ago, when the new Cranbury labs were completed, Cities Service turned its attention specifically to antirumble additives.

A host of problems faced Cities Service researchers as they sought the new additive. Some additives had side effects that completely nullified beneficial effects.

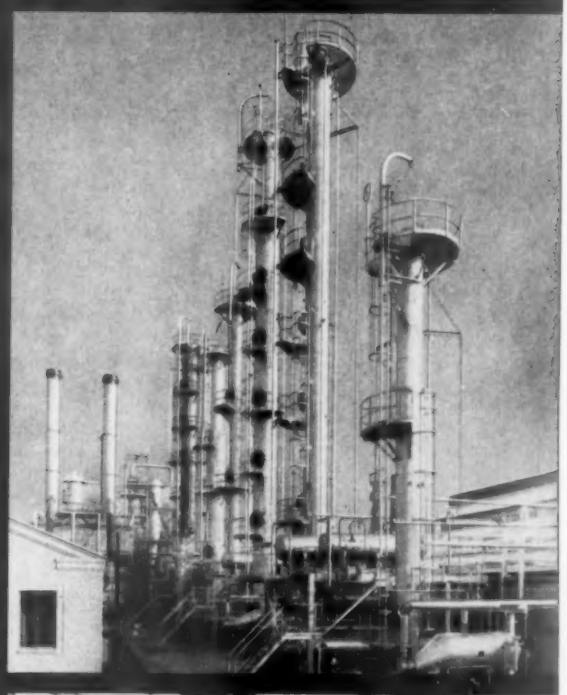
The phosphorous compounds tested had various organic "handles" (the organic material with which the phosphorous is chemically combined). Phosphorous combined with the wrong organic handle can have reduced rumble-suppressing efficiency. In addition, it may even have de-

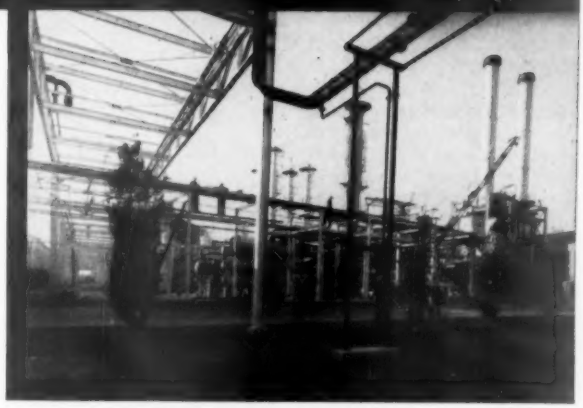
In Germany...

ANOTHER JOB WELL DONE BY PROCON



Heat exchanger in foreground, fractionation tower at left and heater stacks on right during construction.





Top—Fractionation section of the finished Platforming and Unifining units.

Bottom—Nearing completion, heat exchangers, left, in series with the fractionation section and heaters on the right.

Procon construction helps rebuild Deutsche Erdöl A.G. refinery at Heide, Germany

With a well-planned reconstruction program the Heide refinery of Deutsche Erdöl A.G. Hamburg, is rapidly regaining leadership among European petroleum refiners.

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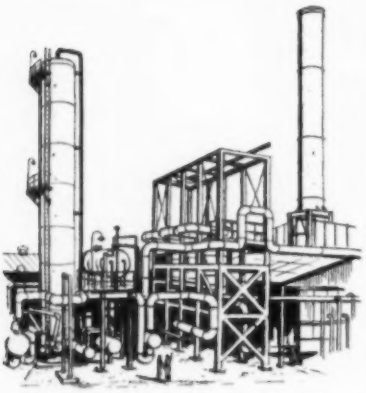

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leterious effects on engine performance.

While some of the additives tested by Cities Service helped rumble, they also fouled the engine intake system. Others that helped rumble turned out to degrade the octane level of the gasoline. Some additives increased combustion-chamber deposits. And some, because of the size and type of deposits formed, increased the rate at which the engine, in use, would require higher octanes for satisfactory performance.

At least 16 different additive materials, some with and some without phosphorous, were tested for antirumble properties by Cities Service.

While, to date, phosphorous has shown the best results in suppressing engine rumble, other materials also showed promise, and will be the subject of further research.

Along with its studies on additives, the company made adjustments in fuel composition to increase the antirumble effectiveness of its motor fuel.

Because of the difficulties in making radical changes in basic gasoline composition economically, studies of gasoline composition in relation to rumble had to be limited to those practical within the economics of conventional refining.

The final antirumble gasoline now on the market does incorporate such adjustments in composition.

Detroit's preoccupation with increased compression ratios will put an increasing number of new car models in the rumble-prone range in years to come.

According to Detroit spokesmen, the best educated guess of the number of cars on the road today with compression ratios of 9.5 to 1 or higher is 5.2-million, or about 9.3% of total car population.

For 1959 models, estimated to sell at the rate of 5.5-million, just about one-third will have compression ratios of 10 to 1 or higher. From 1960 on, it's anybody's guess, as compression ratios can be conveniently changed up until three months before introduction date for the new model car. The way things look now, 1960 compression ratios will be about the same as in 1959 models, give or take a little.

What's New / IN PROCESSING

The petroleum industry is going to be a key factor in fuels and propellants for aircraft, missiles, and space craft for a long time to come.

Missile fuels will be based on petroleum, though it will have to be altered considerably chemically to meet high-speed, high-altitude, high-energy missile needs, according to P. M. Terlizzi, of Stauffer Chemical Co., speaking before the National Petroleum Assn. meeting at Atlantic City, N.J.

The petroleum industry, with its highly developed research and development skills, will continue to lead in the development of these fuels, according to Terlizzi and other NPA speakers.

•

Phillips Petroleum Co. reports "spectacular successes" for its new kind of synthetic rubber, cis-polybutadiene, in truck and passenger car tire tests.

Compared to natural rubber, the new Cis-4 is said to give 30% to 40% longer tread wear and less heat generation. Phillips plans to expand pilot plant production of Cis-4. Discovery of the rubber, made from low-cost butadiene, was first announced by Phillips in April, 1956.

•

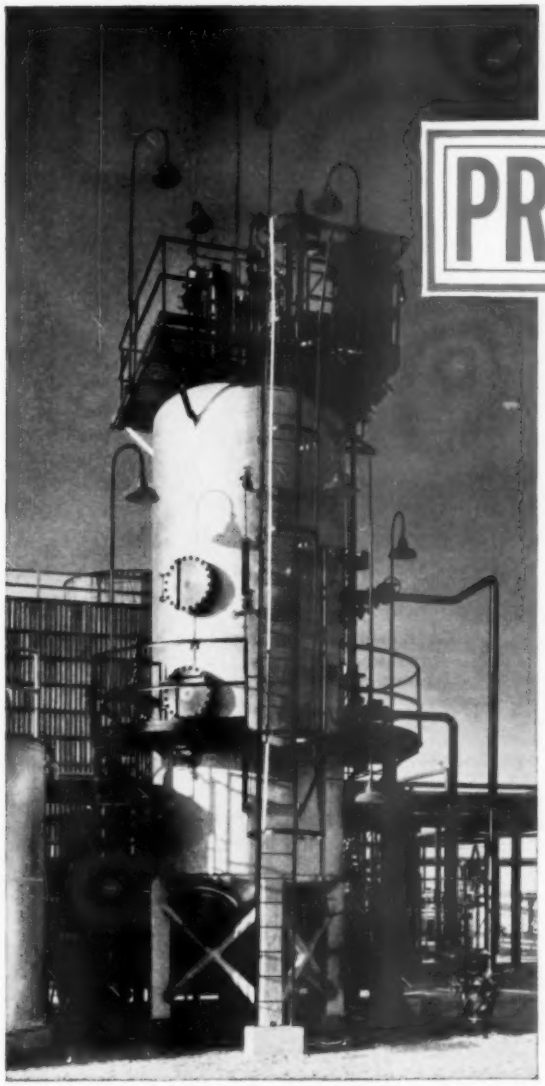
Naugatuck Chemical division of U.S. Rubber Co. claims commercial production of the most heat-resistant polyester plastic yet developed.

The new plastic, Vibrin 136A, is being produced at the company's Naugatuck (Conn.) plant. The plastic is said to have twice the heat-resistance of previous polyesters. It will stand a sustained temperature of 500F and a peak load of 1,000F for short periods of time.

•

Shell Chemical Corp. will begin construction of a phenol unit at its Houston plant early in 1959.

Most of the unit's production will be used to make Bisphenol A, one of the ingredients in the company's Epon resins. Shell Oil Co. will also take a share of the phenol.



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THE FIRST TEST by a U.S. group has just been spudded (left) on the Ivory Coast, the only French territory outside the Sahara with U.S. holdings. But good results from oil drilling in Gabon (right) are luring new firms into French Africa, where . . .

Lack of Unified Law Slows Oil Deals

U.S.—and other—oil companies seeking acreage in French Africa are finding negotiations hampered by the lack of a unified oil law.

Increasing interest is being shown by oil companies in this vast area, which stretches from the Sahara to almost uncharted lands near the equator. Besides Algeria, the area includes Gabon, the Middle Congo, the Ivory Coast, Senegal, French Cameroun, and Madagascar.

Most of the territories are covered only by skeleton general regulations, which leave such important details as royalties, taxes, depletion allowances, and required investments to the discretion of local governments, which enjoy a limited autonomy.

Under these regulations, O.K.'s are needed from both the French and territorial governments before a company can search for oil. (The regulations were drawn up by the French in 1954 and amended in 1957.)

Exploration permits can be granted only to companies set up under French law. Before authorization is granted, companies approved by the French Minister of Overseas Territories can draw up preliminary agreements with local governments. These would define rights and obligations of both parties, covering control of the venture, exploration programs, transport of crude, and local refining.

Certain franc-zone oil needs must be met before the companies can freely dispose of their production.

Exploration permits are granted for an initial period of five years, renewable at least once for an additional five years or more each time, with automatic reductions of acreage.

Development rights are automatically granted on the discovery of oil. They are good for four years, renewable four times for four years each.

Such development permits are convertible into 75-year concessions.

So far, only Madagascar has set up an oil decree setting forth royalty payments.

On annual production of 100,000 tons or less at each field, Madagascar will get 4% or, if the oil is exported, 7%. From 100,000 to 2-million tons, royalty is set at 8%. Above 2-million tons, royalty is open to negotiation.

A new 50-50 oil law is in the works for the Sahara, however, which may serve as a model for the other French territories.

Drawn on the lines of standard Middle East agreements, the new Sahara draft law provides for 50-50 profit-sharing, including taxes and a 12½% royalty. Other features are: the possibility of amortizing exploration costs in the first year of production; a guarantee against any indirect taxation; no bonuses required; and a percentage of depletion like that in the U.S.—50% of profits or 27½% of gross sales, whichever is lower.

So far, the Ivory Coast is the only French territory outside the Sahara where U.S. companies have ventured.

Plymouth Oil Co., Benedum-Trees Oil Co., and M. L. Benedum, with Soc. Africaine des Petroles, hold a 3,720-sq. mi. permit covering the whole Ivory Coast Tertiary-Mesozoic basin. The French company holds a 51% interest, Plymouth 39%, and the other two 5% each.

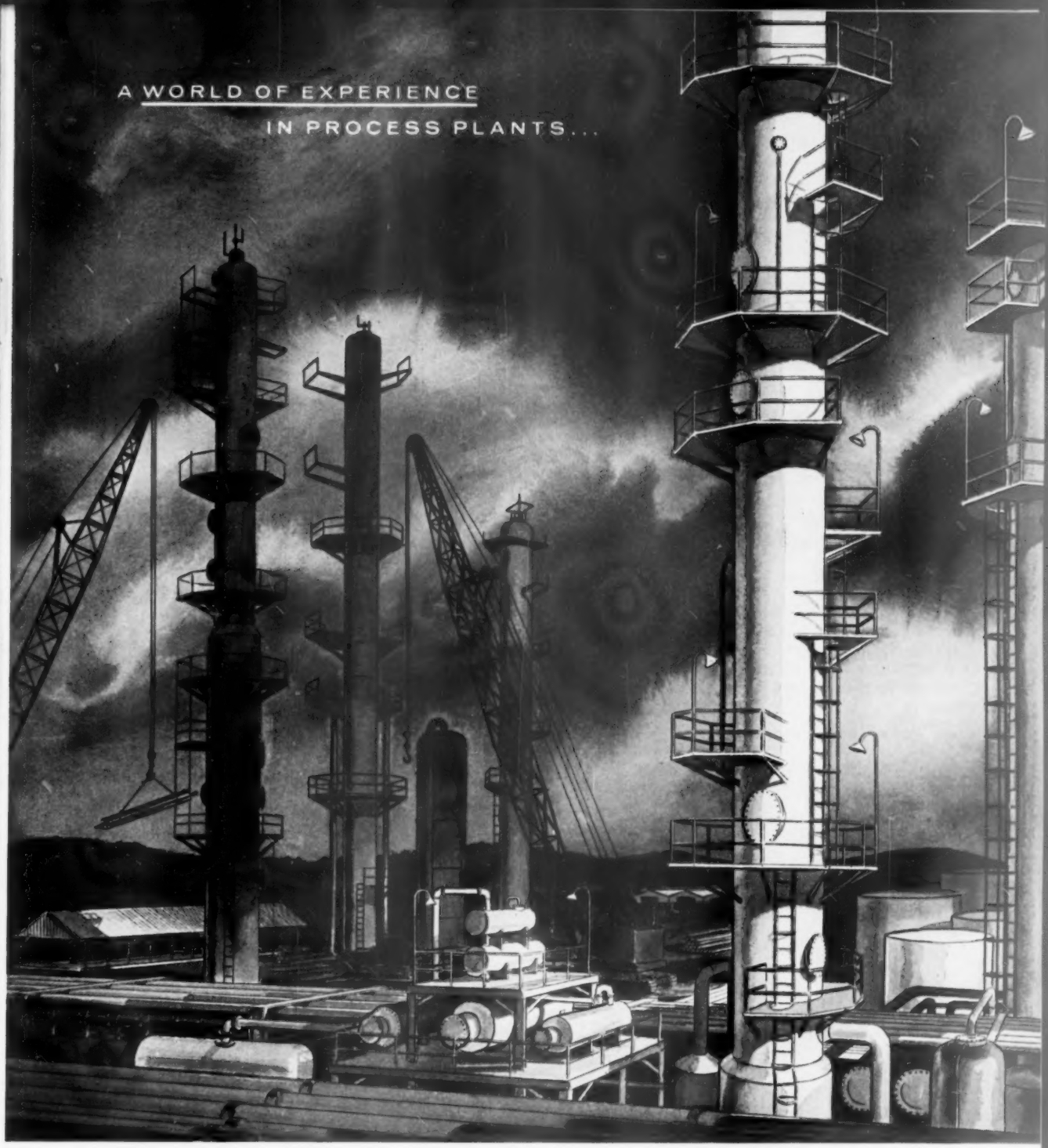
The companies have their first test under way a few miles east of Abidjan (PW—Aug.29'58,p31). The well is being drilled by Laughlin-Porter Drilling Co., Midland, Tex.

One or more U.S. majors may enter French Equatorial Africa, where commercial production is already established in Gabon.

Soc. des Petroles d'Afrique Equatoriale Francaise (Spaef) has worked out a long-term agreement with local authorities covering development over the next 25 years. The company holds a permit covering the entire sedimentary basin of Gabon, plus a permit for the Middle Congo.

The company is now negotiating with California Standard, Socony and Gulf (PW—Sep.12'58,p53), following the conclusion of a 50-50 joint-venture exploration pact for Gabon with Royal Dutch Shell. The agreement covers a 1,544-sq. mi. tract south of the Lagoon of Iguela.

Spaef's agreement with the government specifies that the company will pay the government of French Equatorial Africa 12% of its annual gross profits, minus royalties and acreage taxes already paid for the year. Royalties and taxes will be paid even if there's no profit. In exchange, the government promises not to raise taxes during the 25-year period.



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Pan Am Keeps Up Its Whirlwind Pace

There's no slowdown visible yet in Indiana Standard's whirlwind-paced move into exploration abroad. In fact, the move is likely to spread even more widely. under new participations with other companies.

Through Pan American Petroleum Corp. and Pan American International Oil Co., it has already—in scarcely more than a year—gained a foothold in Latin America, the Middle East, Europe, and Africa.

Though its 60-40 Saudi Arabian deal (page 22) is the biggest new move in sight now, Pan Am International is not overlooking lesser chances of spreading its interest widely—partly through taking up shares in existing oil rights.

The U. S. major took its first big giant step back into the foreign picture last year when it reentered Venezuela—in partnership ventures on some acreage, solo on other tracts. At that time, its only foreign acreage was in Cuba.

Since then, it has moved fast. First it moved into Libya, then Iran. Now it has also acquired rights in the French Sahara, on top of its scarcely-dry contract for development in Argentina.

Under recent partnership deals, the company has also edged into mainland Italy and Mozambique.

In Italy, Pan American joined Cities Service, one of the few U. S. companies holding acreage on the mainland. Seismic work is now being started under the joint venture on some 865,000 acres lying between the Abruzzi area and the "instep of Italy.

And in Mozambique it has agreed on a 50-50 venture with Gulf Oil, which has already drilled several wildcats in the Portuguese African island province (PW—Jul.25'58,p45).

It's possible that Indiana Standard may wind up with an interest in the Morocco acreage recently awarded to Italy's Ente Nazionale Idrocarburi, one of the companies with which Pan American has been discussing participation deals.

Pan American is known to have been interested in the Moroccan tract awarded to ENI, but reports of a possible exchange of interests involving Pan American's Libyan acreage have not been substantiated thus far. The company, incidentally, flatly denied rumors of a sweeping deal for a world-wide exchange of interests with the Italian state-owned company.

Thus far, at least, the company's exploratory talks with ENI on a possible exchange of economic interests in their respective Iranian Persian Gulf rights appear stymied, and there is some doubt whether either company is prepared to press the matter further.

Pan American has been reluctant to discuss the proposition, but it is known that ENI president Enrico Mattei was interested—in principle.

The chief stumbling block, it appears, was the basis for the proposed mutual exchange of 50% shares in the adjoining Persian Gulf tracts they each hold under 50% partnerships with National Iranian Oil Co. The exchange was to involve sharing both in expenses and in oil.

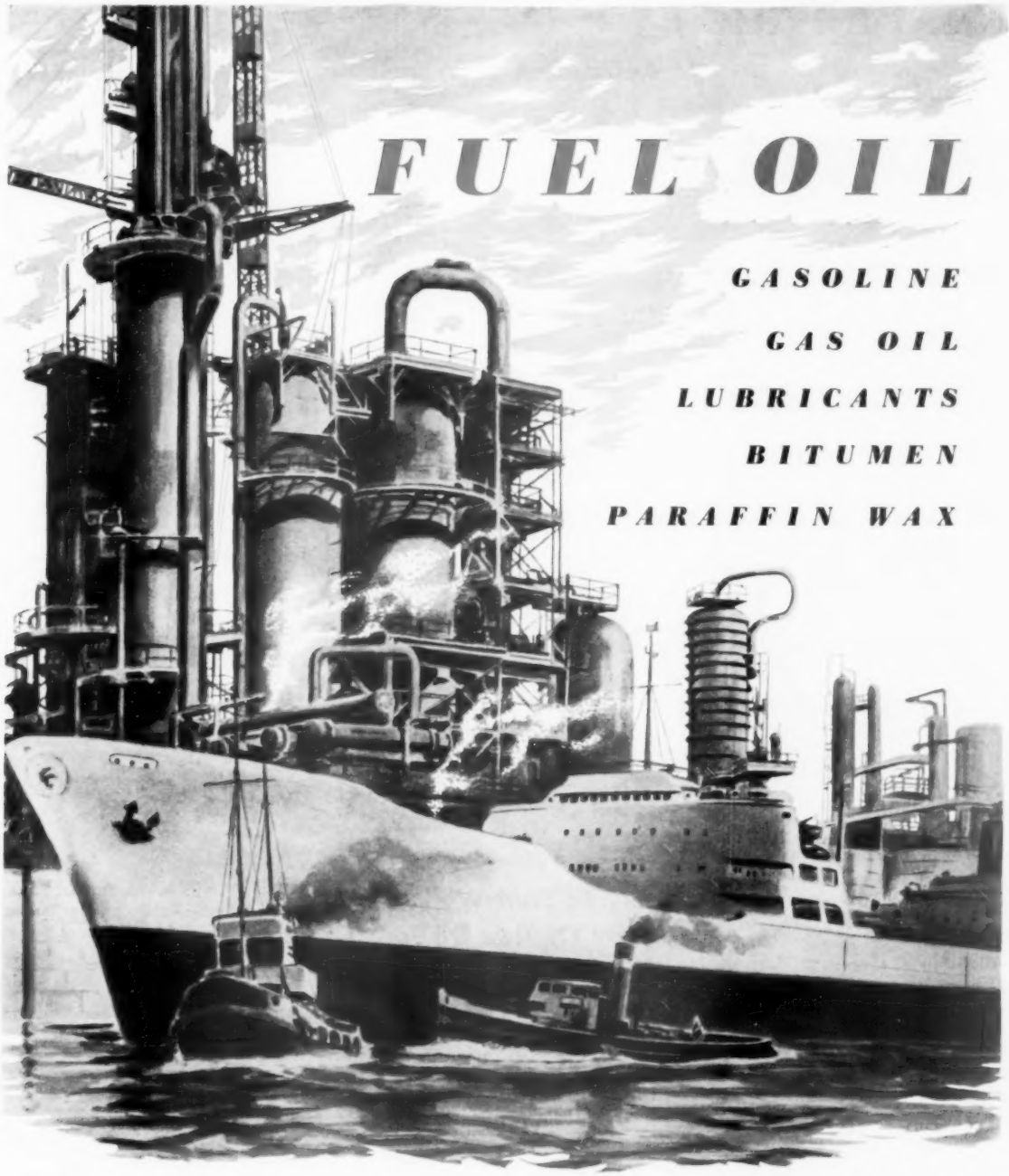
The catch was that ENI proposed exchanging 50% of the half-interest it holds in its 5,600-sq. km. offshore tract for the same percentage share in Pan American's 16,000-sq. km. acreage (which includes two offshore tracts sandwiching the Italian-Iranian block). Under such a deal, of course, ENI would stand to gain far more than Pan Am, particularly since the U. S. company's investment obligation is much greater.

Pan American, on the other hand, is said to be standing firm on sharing interests in a designated and equal amount of acreage.

New Installations Spring Up Around Red China Refinery

Hundreds of storage tanks have sprung up on the construction site of Red China's new refinery in the northwestern industrial center of Lanchow. The Communist government says the 50,000 b/d plant will start operations at the end of the year. This would be the first of two large announced refineries. The other is a 60,000 b/d plant slated for Nanking. Total Chinese refining capacity is now 42,000 b/d, according to the government.

The Lanchow plant will be fed by a 429-mi. underground pipeline from the Yumen fields, the government indicated. Later, when a rail line is completed, additional crude will come from the Karamai field.



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What's New / AROUND THE WORLD

BOLIVIA—More control of foreign investments is proposed in amendments to the Oil Code now being prepared by the left wing in the Senate.

Also under consideration is a recommendation by the Senate Oil Commission that Article 161 be amended to give the legislature the power of approval on development contracts concluded in the zone reserved to the government oil company. (All other zones are open to direct concessions to private companies.)

•

AUSTRALIA—A doubling in the tariff on imported gasoline is being requested here by Shell and other Australian-based refiners, all of which are controlled by overseas companies.

Hearings are now being held by the Tariff Board, and a decision is expected in several months.

•

ARGENTINA—A new well was brought in at the Madrejones field last week with initial production of 1,105 b/d of oil and 31.8-million cu. ft. of gas daily through 55/64-in. choke.

Yacimientos Petroliferos Fiscales, the government oil entity, said the MM-14 well, drilled to 13,776 ft., confirms the "exceptional" potential of Madrejones, Argentina's northernmost field.

•

TURKEY—Bolsa Chica Oil Corp., Los Angeles, is preparing to drill its second wildcat on a 370,000-acre block in Zone V.

Its initial test, No. 1 Zengilan, was abandoned at 6,449 ft. with no significant shows. The No. 1 Hazro, planned for 6,000 ft., will be drilled 17 mi. to the east.

•

USSR — Large-scale development of the gas industry in the next 15 years has been slated by the Council of Ministers.

The gas-production target for 1965 is set at 150-billion cubic meters; the new plans call for boosting this to 270-billion to 320-billion by 1973. This would be 13 to 15 times last year's total gas output.

•

EGYPT—The Pan-Arab Oil Congress apparently will be postponed again. The new Iraq government has asked the Arab League to delay the Cairo oil parley, scheduled for November, until January or February to give Iraq time to prepare its material.

•

POLAND—Russia will help Poland build a refinery with initial capacity of 40,000 b/d in 1963, and up to 160,000 b/d "in later years," according to Radio Warsaw.

Under an agreement signed in August, construction is to start at an undisclosed site in 1960. Total capacity of all of Poland's present refineries adds up to 15,000 b/d.

•

USSR—Average output per well in the Soviet Union is 64 b/d, the Russians report. The 35,000 wells in the country produce a total of 2,240,000 b/d.

IPC To Start Work On New Oil Port

IRAQ—The start of a major project to triple the oil export capacity of Iraq's southern fields to nearly 600,000 b/d was announced last week (PW—Nov.8'57,p38).

Iraq's Oil Directorate officially announced that Iraq Petroleum Co. will start work in November on a $45-million offshore oil port capable of handling 100,000-ton tankers. The site will be 20 mi. south of Iraq's small Persian Gulf oil port of Fao.

The floating terminal, linked with Fao by two 32-in. submarine pipelines, will accommodate two tankers simultaneously.

Loading rates will be up to 30,000 bbl. per hour at both berths, or 52,500 bbl. at one. The island will be composed of five platforms joined by catwalks.

VENEZUELA—A one-year, $10-million "compensated trade agreement" to exchange oil—but not royalty crude—for Argentine goods was approved by the government last week.

The pact, due to be signed this week, is extendable after a year. It provides that Argentina's state oil entity buy oil in Venezuela from the producing companies and transport it in its own tankers. The value of purchases is to be deposited in dollars with the two countries' central banks, with any balances to be settled in local currencies at the end of the year. Venezuela had earlier turned down Argentina's barter proposal for royalty oil because Venezuela would lose the premium paid by the producing companies for purchases of the royalty crude as well as its profit on the special oil company exchange rate.

•

JORDAN—A subsidiary of Italy's state-owned Ente Nazionale Idrocarburi last week won a $9-million contract to build a 6,400 b/d refinery at Zarkah, north of Amman, against competition from British and West German firms (PW—Aug.22'58,p46).

Jordanian Oil Refinery Co. (50% owned by the government) gave the award to Soc. Nazionale Metanodotti. It will also award a separate contract soon to one of ten international bidders for a 30-mi. pipeline to draw crude for the refinery from the Trans-Arabian Pipe Line.

•

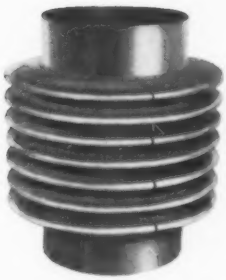
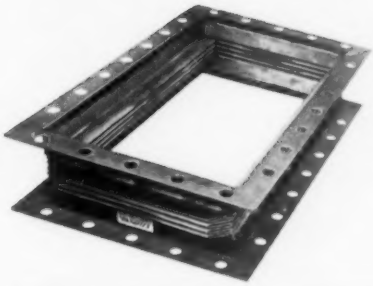
PHILIPPINES—A proposed 10,000 b/d refinery announced earlier this year by Gulf Oil has been approved by the National Economic Council (PW—Feb.14'58,p17).

It will be set up in Luzon by a new refining and marketing company controlled at least 60% by Filipino interests. Gulf will have a minority interest and supply the crude. A long-pending Royal Dutch Shell proposal for a 20,000 b/d refinery also was recently approved.

•

ISRAEL—The government's need for large-scale investment in the oil business and other enterprises may lead to a reversal of Israel's predominantly state- and labor-owned economy.

This is seen in a government offer to sell a dozen state enterprises—in full or in part—to an unspecified U.S. group. Delek, the state's oil importing and marketing unit, and a projected tanker-operating outfit are said to be among those offered.

Solar  builds 

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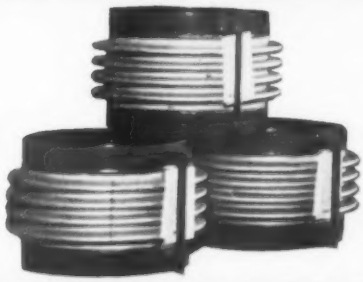
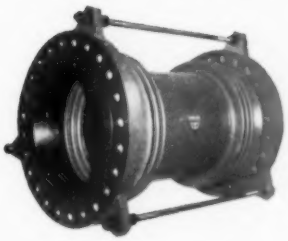
array of  industrial

expansion joints 

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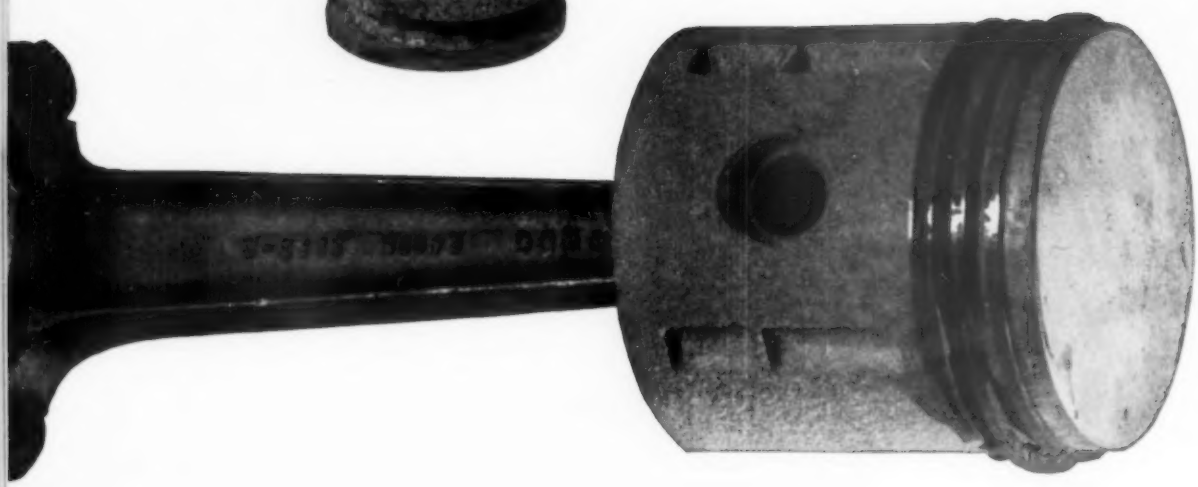

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Gears and pistons were used to illustrate the damage of corrosion more vividly. The basic idea of the ASTM Steam Turbine Oil Test in which probes are ordinarily used was not changed.

ARMOUR DUOMEENS® OFFER COMPLETE PROTECTION AGAINST CORROSION!

Here you see 2 pistons and gears after 20 hours in a modified ASTM Steam Turbine Oil Test. The piston and gear in the "control" oil-brine solution were badly corroded. *There was no corrosion on the lower piston and gear when only 60 ppm Duomeen salt was added to an identical solution. Both parts stayed as shiny and clean as when the test began!*

It is hypothesized that the Duomeen plated-out on the metal surface as a closely-packed mono-molecular film, enabling the surface to become preferentially oil-wettable. By such action, a highly effective diffusion barrier is formed, even at very low concentrations, which acts to inhibit corrosion.

Versatile Duomeens make all refinery products function better

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Send for the new Duomeen booklet, product samples and application information.

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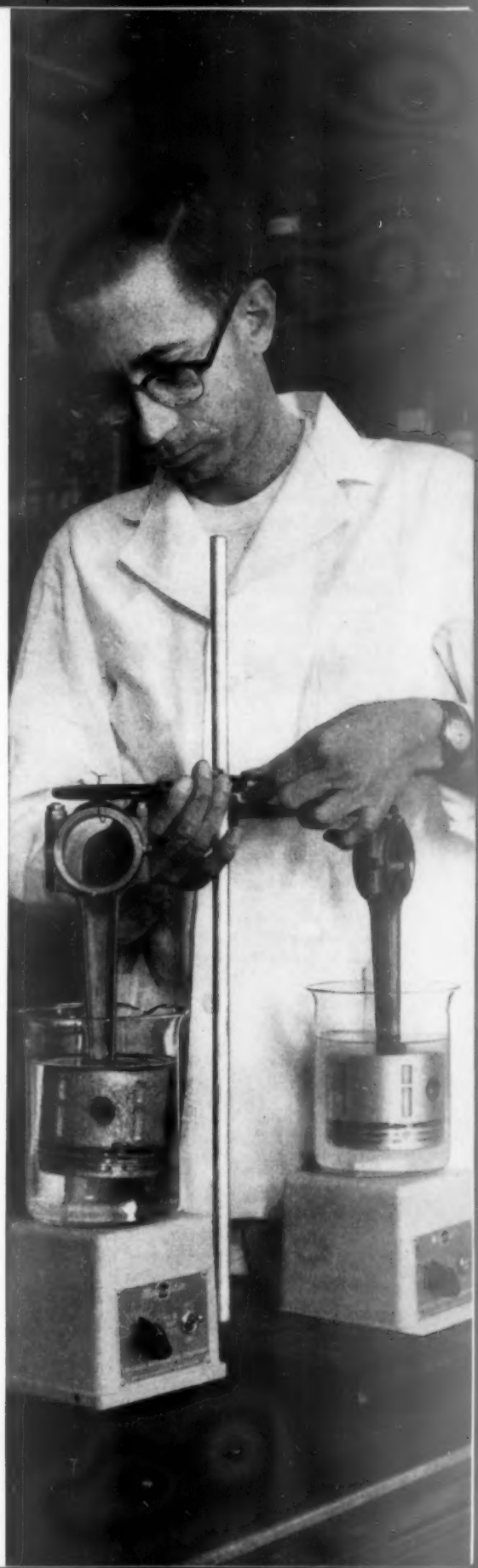


DEPT/Transportation & Storage

What Kind of Pipeline Prime Movers?

Pipeliners this week got a new, up-to-date cost yardstick to help them choose the right prime mover for the right pipeline situation.

There was a time—in the early days of pipelining—when there was no need to "choose" a particular kind of prime mover; in those days, there was just a single energy source available—the energy from whatever was being pumped—and pumping equipment was designed to run only on such energy.

But today, with other energy sources available, pipeliners planning installation of new pump stations or replacement of old ones must weigh carefully all the characteristics of the available types of prime movers.

Original investment cost, for instance, now seems to favor installation of electric-motor pumps.

This is one of the major conclusions of a new study on selection of prime movers by Otto F. Zedler, Jr., Humble Pipe Line Co.'s chief engineer.

Zedler told the fifth annual Petroleum Industry Conference of the American Institute of Electrical Engineers earlier this week that the investment cost for an electric squirrel-cage, induction-motor prime mover is now well below that of all the other major kinds of prime movers—the gas-fired turbine, and the diesel, gas, and dual-fuel engines (chart).

Zedler includes three major expenditures under original investment:

- Cost of buildings and equipment needed to house the machinery and operating personnel. In most cases, Zedler contends, motor installations require "very little in building investment."
- Cost of the main pumping units. Zedler estimates that expenditures of this kind "will generally range from 2½ to 3 times greater for combustion-type prime movers than for electric motors."
- Service systems and auxiliary devices for the whole pump station. There is little difference in this cost according to Zedler's estimates, between the electric and combustion-type pump station.

Another advantage of electrically-driven pumps: Generally speaking, their maintenance cost is now far below that of other types of prime movers.

Zedler says that the cost of maintaining rotating machines is nearly independent of the load they carry, while the cost of maintaining engines is directly proportional to their load.

For this reason, the Humble engineer estimates that maintenance for even the most economical pump station engine is about four times as great as the maintenance cost of an electric-motor station. "Furthermore," Zedler maintains," the figure may more than double for the high-speed engines."

However, the electric prime mover still ranks way behind all other types of pumps in the all-important matter of cost of energy.

Zedler cautions that such comparative cost figures can vary over a wide range depending on location and size. But he figures that the "fuel expenditure" for the electric motor will cost about four times as much as the cost of supplying fuel for the high-compression gas turbine, which now ranks as the most economical prime mover in terms of energy cost.

No concrete formula for choosing a prime mover can be arrived at because of the varying circumstances of each installation. But it's clear that the difference in energy cost can often rule out the electric motor.

"A rough rule-of-thumb that may be used in the broadest sense," says Zedler," is that if the electrical energy cost is greater by more than $21 per horsepower-year, it is likely that the other source will prove a better investment."

Although cost considerations are of major importance, "intangible advantages" are important too. And some of these "intangibles" are now making the electric-motor prime mover increasingly attractive.

Zedler refers to the "intangibles" this way:

- Flexibility—"In this regard, the advantages of an outdoor motor installation, in less weight, space, building and foundation requirements, services, and auxiliaries are recognizable.
- Simplicity—"In this regard, the motor installation takes precedence. Other prime movers can be adapted to automatic or supervisory control, but in every instance their control and protective systems are more complex, and therefore subject to failure."
- Safety—At the well-planned and constructed electric-motor station, Zedler contends, "there is no combustion chamber to invite fire or explosion; personnel cannot be trapped; there are no elevated service areas to cause falls; no hot surfaces to cause burns; and a minimum of moving parts."
- Aging effects—"Assuming normal maintenance and operations, efficiency of engines can be expected to decrease more rapidly with age than that of turbines and certainly more than that of electric motors, which will show virtually no change."
- Altitude and temperature—"Motors would have some advantage at higher altitudes, where lower ambient temperature would normally be expected."
- Future Costs—Although electricity is relatively expensive as a fuel for prime movers today, Zedler sees a change coming:

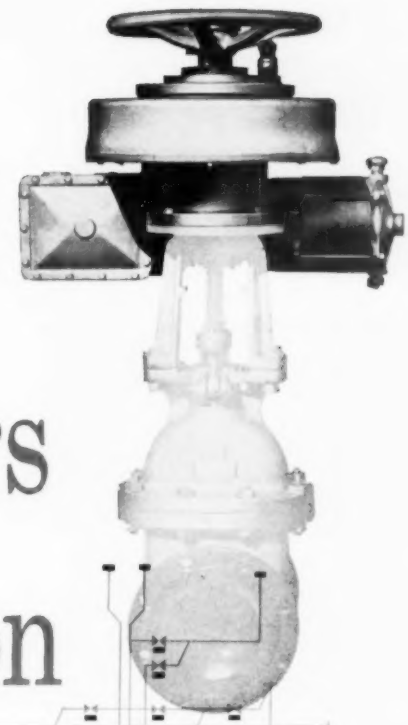
"Analysis of gas rates over the past ten years shows a definite upward trend ranging to a 50% increase in some areas. There is no evidence of such a marked trend in electrical energy costs."

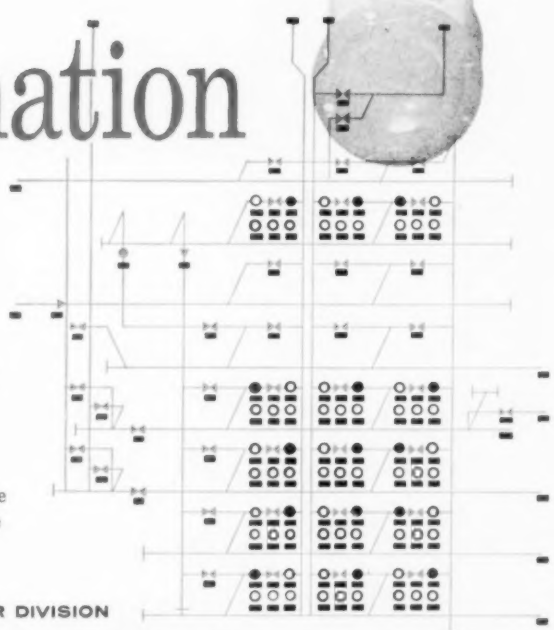
However, a mighty big "intangible"—reliability—still is on the side of the traditional prime movers that take their energy from their own pipeline.

Today's Pump Station Cost Line-up

Type of pump	Investment Cost per hp	Maintenance Cost per hp-yr	Energy Cost mills per hp-hr
Electric (squirrel cage, induction motor)	$50-100	$0.5-2	4.9-9.5
Gas fired turbine	$160-280	$2.5-6	1.2-3.4
Supercharged diesel	$145-245	$4.5-12	4.5-8.8
Supercharged gas (high compression)	$140-240	$3-8	1-2.7
Supercharged dual fuel	$150-250	$4-10	1.4-3.1

manual valves plus TORK-MASTER electric valve operators equal automation





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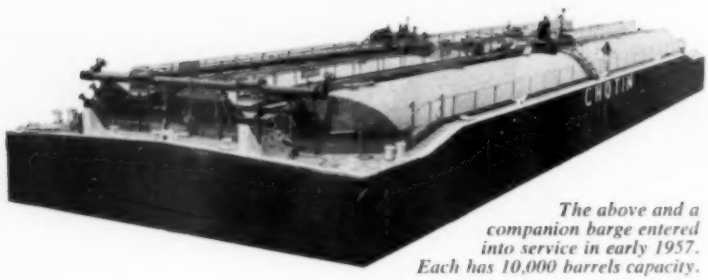

The above and a companion barge entered into service in early 1957. Each has 10,000 barrels capacity.

Chotin's answer to an Esso requirement . . .

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The above pair, newest barges in our fleet, began service in Spring, 1958—carry 18,000 barrels each.

Barges are towed in twos and threes to speed service, cut down tie-up time at terminal.

Esso Standard Oil Company required equipment to transport hot asphalt and when it outlined its requirements, Chotin Towing Corp. provided the practical, money-saving answer.

Chotin engineers and experts of the Nashville Bridge Company combined talents to develop a completely new concept in hot liquid barge transportation. Constructed of lightweight, high-tensile steel, the new barges were designed to embody the latest in heat control to guarantee the right temperature every mile of every trip.

Light weight, big capacity, individual insulated tanks and shallow draft are just some of the savings features of these barges . . . some of the reasons why Chotin Towing Corp. answered this requirement in their usual swift, efficient, economical manner.

For over 50 years America's leading inland shippers have found Chotin barges and tows a good answer to their movement problems. If yours is a water transportation problem anywhere in Mid-Continent U.S.A. let us show you how we can solve it with speed—with surety—with savings! No obligation, of course.

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Remote-Control Lines Get Boost

Any lingering doubts that the "completely automatic" pipeline will figure more prominently in the industry's future were shaken this week by descriptive data on two new lines which are designed to operate with all pump stations unattended.

Although remote control of individual pump stations is nothing new, remote control of a complete pipeline system is something else again. Only a handful of systems have such complete remote control—but their number is increasing (PW—Mar.28'58, p50).

Those who attended this week's petroleum conference of the American Institute of Electrical Engineers got a good idea why:

One line, a big-incher now being built from Wilhelmshaven, Germany, to Cologne, is designed to deliver up to 500,000 b/d of crude on a completely remote-controlled basis.

The 230-mi., 28-in. line is being built by Nordwest Oelleitung GmbH.

R. S. Cannon, of Plantation Pipe Line Co., who helped design the line, told AIEE that "the Germans are, to some extent, pioneering in attempting remotely operated deliveries on such a large scale."

"The sequence control and protective scheme worked out for the pump stations follows modern practice in this country," Cannon said. "Outbound line pressures and station suction and discharge pressures from each station will be telemetered to recorders on the [Wilhelmshaven] control desk."

Annunciating-type indicating lights and alarms, Cannon reported, will indicate power failure; station high and low discharge pressure; high outbound line pressure; and station mechanical and electrical failures.

Communication will be over leased wires.

The other line, the Four Corners-to-West-Coast line, is already using a remote-control system to move crude over a much longer distance —750 mi.—and through some rough country, too.

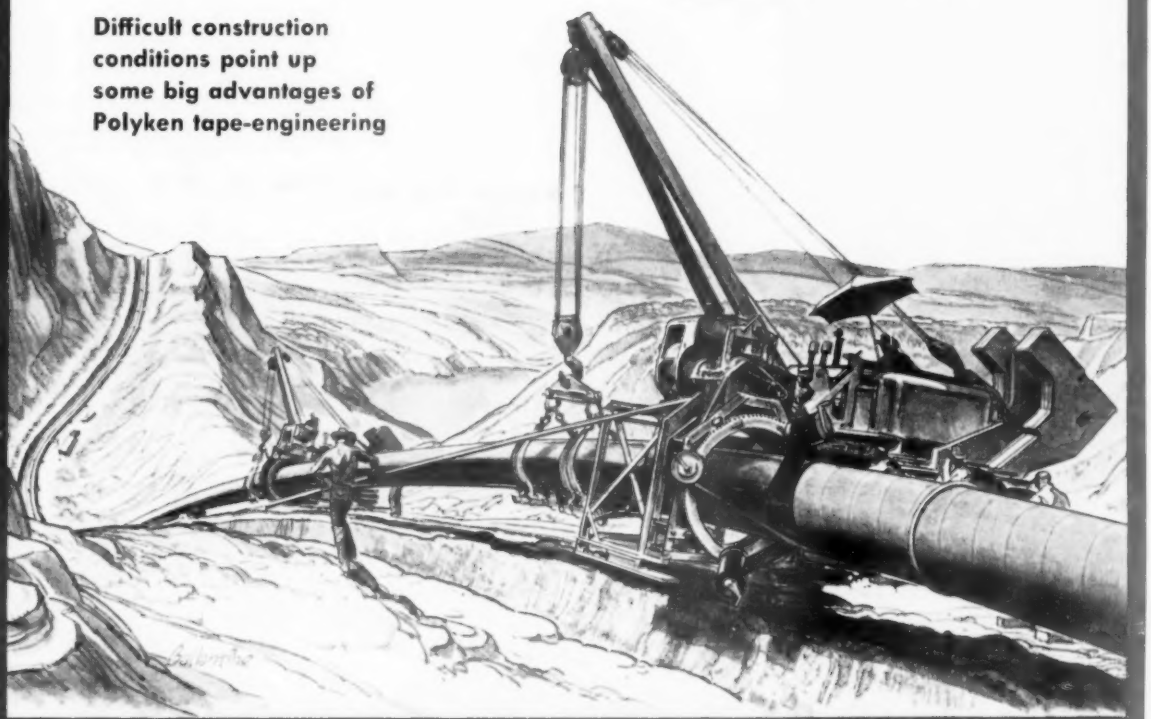
J. J. Sonnier and H. N. Siler, of Shell Pipe Line Corp., which operates the line, reported that telemetering and supervisory control make possible "complete unattended operation."

"The design of the communications [microwave] and control features," they said, is providing "safe and reliable operation of the pipeline from . . . the western terminus of the line."

Why do Canadian spreads coat with Polyken tape?

(the proven polyethylene tape)

Difficult construction conditions point up some big advantages of Polyken tape-engineering



Canadian pipeliners have learned their business the hard way. That's why many have turned to Polyken tape and Polyken know-how—for proven results like these:

1. Substantial labor and equipment savings due to simplified operation.

2. Faster construction—consistent high daily output.

3. No hot dope preparation—tape is always ready.

4. No drying or cooling time. Simple clean-wrap-and-lower operation makes for a tight spread and closer supervision.

5. Vastly reduced warehousing, shipping, handling costs.

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7. Wrap goes into ground in factory-uniform condition.

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What's New / IN TRANSPORTATION

The Interprovincial pipeline is almost ready to carry a heavier crude load from Alberta fields to refineries in the Sarnia (Ont.) area.

Interprovincial Pipe Line Co. and Lakehead Pipe Line Co. have just finished looping the big-inch line between Edmonton, Alta., and Superior, Wis. The loops are 24 in. and 26 in. in diameter (PW—Jan. 17'58, p53).

When the expansion of the system's pumping capacity is completed this fall, the Interprovincial system will have a capacity of 275,000 b/d out of Edmonton, 376,000 b/d out of Cromer, Manitoba, and 258,000 b/d out of Superior.

•

A Federal Power Commission examiner has turned down Michigan Wisconsin Pipe Line Co.'s application for a $32-million expansion of its natural gas transmission facilities in Michigan and Wisconsin.

The plan, which would provide natural gas for ten utilities in Wisconsin and one in Michigan, was rejected by FPC examiner Francis L. Hall last week. Hall held that Michigan Wisconsin had failed to establish that it could render the service it proposed.

The decision is subject to review by the commission.

•

Westcoast Transmission Co., Ltd., has extended its natural gas gathering system to fields just northwest of Fort St. John, B. C.

Westcoast says that, by late this year, the new extension will add about 80-million cu. ft. of gas daily to deliveries to its McMahon processing plant at Taylor, B.C.

•

International Refineries, Inc., will build a crude gathering system in Bottineau County, N.D.

The 6-in. and 4-in. system will be operated as a common carrier.

The North Dakota Public Service Commission last week approved International's plan to take crude from the Newburg field in Bottineau County to the town of Newburg. International's own crude will move by tank car from there to the company's refinery at Wrenshall, Minn., near Duluth.

Northwestern Refining Co., which also asked permission to build the gathering system, plans to appeal the commission's decision.

•

Gas transmission companies piled up a 13.4% increase in net income last year over 1956, according to new American Gas Assn. figures.

The companies' combined net income after taxes in 1957 reached $246-million, AGA says.

•

Streamlining of loading and unloading facilities for tank trucks could reduce the cost of moving petroleum by truck by as much as 16%, Lester A. Wilsey, Jr., president of National Tank Truck Carriers, Inc., said last week in a speech before the annual meeting of the National Petroleum Assn.

Wilsey pointed out that, "on the average, 30% of a tank vehicle's operating time is spent in unloading." He said that "this waste must be cut to a minimum" because of steadily rising operating costs.

•

Trans Mountain Oil Pipe Line Co.'s crude deliveries averaged 75,674 b/d in August, but will slip this month.

The company expects deliveries through the line to average only about 60,000 b/d in September, because "maintenance turnarounds are taking place in some British Columbia refineries during the month."

•

British Petroleum Co. has formed a new tanker subsidiary, BP Clyde Tanker Co. The new company will have its headquarters in Glasgow, Scotland, and initially will operate ten tankers.

•

Revenues of major oil pipelines are running behind last year, according to new Interstate Commerce Commission figures. ICC says that for the first six months of 1958 such revenues dropped about 6% from 1957.

Supersonic Service Station

Handling and moving highly-volatile jet fuel has proven to be a delicate operation, with the product flashing and causing damage at several terminals. But this system, recently installed at the Palmdale (Calif.) testing grounds of the Convair Division of General Dynamics Corp., can fuel up to eight jet interceptors at the same time, and with good speed, too—only eight minutes per plane.

The fuel station has eight outlets, each with a 250-gal.-per-minute pump. Two underground storage tanks hold about 40,000 gal. of the JP-4 ready for quick transfer to planes. The system cost Convair $89,000.

Legal payload of this tank was increased 815 gallons because the weight of the tank was reduced 3470 lbs. through USS "T-1" Steel construction.

USS "T-1" Steel boosts payload 10% saves $90 per week

This 9,000-gallon tank truck hauls LP gas on trips averaging 1,000 miles a week. The tank is made from USS "T-1" Steel—44% stronger than the steel formerly used. Because "T-1" Steel is so much stronger, the tank walls were made thinner and the over-all weight of the unit was reduced 3470 lbs. *The weight saved goes into the payload.* The tank carries 815 additional gallons, 10% more payload, and gross weight of the unit stays well under highway limitations.

Lou Marshall, President of Petgas Company, says, "This truck's extra payload and lower tolls save us about $90.00 a week—a saving equivalent to one free shipment a week. At this rate, we'll probably write off the additional cost of "T-1" Steel within six months. From then on, the savings will be extra profit."

Trinity Steel Company of Dallas built the trailer. Their engineers recommended USS "T-1" Steel construction for two important reasons in addition to weight reduction: "T-1" Steel is weldable and retains its strength and toughness at temperatures down to 50° below zero—a big advantage because the truck operates in northern Michigan.

In the oil fields, the high yield strength of USS "T-1" Steel (now available for non-code applications with a minimum yield strength of 100,000 psi) and its exceptional toughness, weldability and resistance to atmospheric corrosion make it ideal for pressure vessels, tanks, derricks and equipment that must have great strength without bulk. Ask your supplier about USS "T-1" Steel the next time you consider new transports. You'll see that it pays for itself in a very short time. If you would like to have more information about USS "T-1" Steel, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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Marketers Are More Optimistic Now...

A new note of optimism is evidenced in forecasts now being made by marketing officials of the sales outlook for 1959 and the next few years. Underscoring this feeling are recent speeches by two key marketing officials predicting increased demand and market growth—in spite of sagging oil company profits during the first half of 1958, and worries about high inventories, import restrictions, cutbacks in domestic production, and government controls. Nevertheless, they warned, the "hard sell" is here to stay—at least for a few years.

. . . About Over-All 1959 Demand

Domestic oil demand in 1959 will increase 4% to 5%, according to a prediction this week by J. G. Jimenez, marketing vice-president of Tidewater Oil Co. There's reason for optimism, Jimenez told the National Industrial Conference Board marketing conference meeting in New York.

Jimenez forecast this gain in domestic oil demand during a cross-industry panel session on "The Sales Outlook for 1959." He also predicted that free world demand, exclusive of the U.S., would increase 7% to 8% next year.

Jimenez cited these factors as indicative of a "healthier business climate in 1959 and the years ahead":

Prices are firming up, after hitting the lowest level on gasolines and distillates since 1950, Jimenez said.

Jimenez attributed oil's cost-price squeeze during the past year to the liquidation of surpluses created by abnormal domestic production and refinery runs during the Suez crisis. He pointed, however, to recent increases in wholesale and retail prices as a sign the decline may be over.

The prospect of the usual sharp seasonal increase in heating oil demand is one of the bright spots in the sales picture for the rest of 1958, said Jimenez.

Citing recent gains in domestic demand, the Tidewater official went on to say, "There is reason to believe that we will experience gains each month for the rest of the year. Despite a poor first six months, domestic petroleum demand for the entire year should record a 1% to 2% increase over 1957."

Motor vehicle registrations are expected to increase 4% next year, he said. This will contribute to an increased domestic gasoline demand of 3% to 4%. By 1965, he predicted, an estimated 14-million more motor vehicles will be on the road.

Population is expected to climb to 177-million next year, an increase of 1.7%. The U.S. population in 1965 is expected to be some 18-million more than it is now. Fuel oil marketers will have a chance to compete for the business which will be provided by the estimated 12-million more homes predicted for 1965, according to Jimenez.

A 6% increase in industrial production is predicted for next year, which means bigger demand for fuels and lubricants.

"Increased industrial production," Jimenez said, "should cause our refineries to increase crude oil runs 5% to 6% to keep pace with demand and maintain adequate stock levels. This will be taken in stride as refinery capacity is in excess of requirements. . . . We are also told that as much as a 33% increase in industrial activity will be recorded by 1965."

Future profits, however, will be tied to a "hard sell" and tight control of expenditures, Jimenez cautioned.

He cited estimates that the oil industry will make some $77-billion in capital expenditures in the U.S. in the next decade.

"This is more than 150% as much as the industry's current gross fixed assets," he commented. "It underlines, more than anything else, why the industry must continue to earn some reasonable profits, so that its financial structure will be strong enough to accomplish these objectives."

. . . About Eastern Fuel Oil Sales

Increased demand for fuel oils in eastern markets over the next five years is predicted by Leonard S. Marshman, manager of Socony Mobil Oil Co.'s fuel oil division.

Marshman made this forecast before the Empire State Petroleum Assn. last week, calling the fuel oil situation "more serious than many appreciate, but not so serious as some would have (us) believe."

Marshman estimated that eastern demand for diesel fuels and residual oils in the next five years will increase faster than it did during the 1953-1958 period.

Marshman told the marketers that they can expect the East Coast demand for diesel fuels to reach 54.4-million bbl. a year by 1963. This year's expected diesel demand in the area is expected to total 44.5-million bbl. The expected 1958 diesel-demand figure is about 19% greater than the area's 1953 diesel demand. The 1963 estimate, in turn, is 22% above 1958.

Residual sales in the East are expected to increase sharply, according to Marshman's figuring. He predicted that 1963 East Coast resid demand will be 15% above this year's. The area's 1958 resid demand reflects only a 7% increase over 1953.

However, demand for middle distillates other than diesel in the region, already slipping, will slide more sharply in the five years ahead.

Marshman said that, "despite a slowing down in the rate of growth during the past two years," the eastern heating oil market has expanded by 30% since 1953. But he warned that the recent slowdown is more than a temporary thing, and that this market can be expected to rise only 18% by 1963.

Traditional uses of kerosine will continue to decline, but this will be offset by increasing demand for kerosine as aviation turbine fuel, which will climb more than 1,000% by 1963, according to Marshman. Kerosine demand for uses other than aviation fuel is expected to fall 9% by 1963.

Demand for LP-gas in the East will increase about 54% in the next five years, Marshman predicted. This means increasing competition in home-heating markets.

Heating oil marketers will have to go into the burner-selling business, and offer a more complete home heating package, to meet natural gas competition, Marshman warned.

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What's New / IN MARKETING

Private-Brand Marketers Gain Outlets, Volume

"The growth of private-brand gasoline retailers should make every segment of the oil industry examine its operations, look more carefully at costs, reappraise its investments, and become more efficient," M. J. Rathbone, Jersey Standard president told the National Petroleum Assn. last week.

Rathbone cited the growth of private-brand retailers as one of the most significant changes now going on in oil marketing. Private-branders have some 25,000 outlets in the U.S., he said, and have up to 50% of the gasoline business in some urban markets.

The number of private-brand stations in the East has almost doubled in the past eight years, according to Rathbone, and the volume per station has "approximately trebled."

"Private-branders present a real challenge to other gasoline dealers," he said, "and especially to those whose ability to compete is impaired by low efficiency. This development may alter the entire complexion of one area of the oil industry."

•

Jobbers are often as responsible as majors for low commercial-account prices, Harry Kennedy, Continental Oil Co. vice-president, told the Colorado Petroleum Marketing Assn. last week. In a panel discussion, Kennedy cited 18 recent Denver cases in which jobbers had obtained commercial-account business by underbidding majors.

•

Socony Mobil Oil Co. is planning a "gradual discontinuation" of its St. Louis (Mo.) marketing division headquarters as a part of the company's marketing reorganization to achieve greater efficiency (PW—Jun. 13'58,p72). The marketing district office in St. Louis will report to the Kansas City division after Jan. 1. Other district offices in the former division will report to Chicago headquarters.

•

U.S. service station sales in July were about 2% higher than a year ago, according to the latest report from the Census Bureau. Sales of gasoline, oil, and other items at stations rose to $1.4-billion in July, from about $1.33-billion in June, and about $1.38-billion in July, 1957.

•

Esso Standard Oil Co. has a new group life insurance program for dealers, dealer-employees, and resellers and branded distributors of Esso products. The plan will be available to about 80,000 persons by Jan. 1.

Policies up to $5,000 will be available for dealers, resellers, and distributors under 65, with $2,000 coverage available for their employees. Comparable coverage for those over 65 is $2,500 and $1,000, respectively. Monthly premiums for the policy holder will be 60 cents per $1,000 of insurance.

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The complete details of each article follow in light-face type. To get the whole story, on items of particular interest, just read the light-face type as well as the bold.

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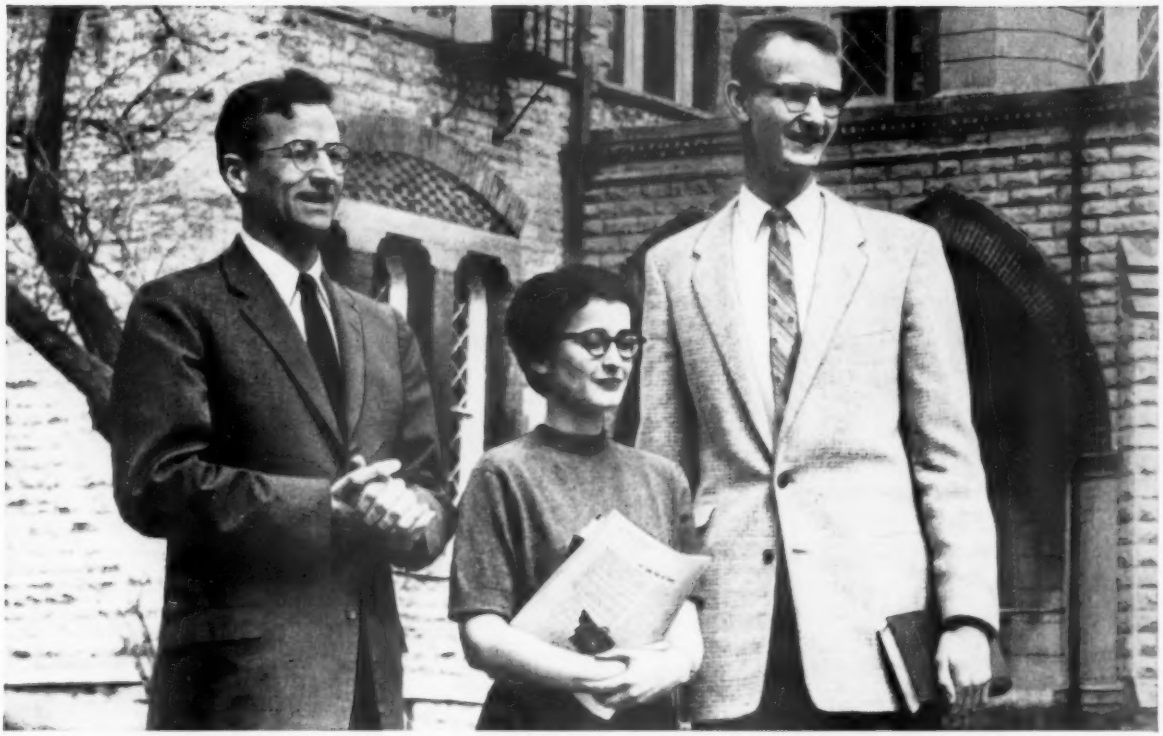

Two students, who hold scholarships awarded by American business, stop to talk to Dr. Howard R. Bowen, president of Grinnell College, Grinnell, Iowa. (L. to R.) Dr. Bowen; Janet Kispert of Stillwater, Minnesota; and Roger Soderberg of Elgin, Illinois. Says Dr. Bowen: "With its help to colleges and students, business is assuring a future source of leaders—not for itself alone, but for every phase of American life."

WHY SHOULD BUSINESS HELP COLLEGES AND STUDENTS?

College educations cost more today, too! In fact, for many young men and women—and for their parents—the increasing cost of a college education has become a major problem. And small, privately-financed colleges also have found themselves threatened by rising costs. Yet it is vitally important to America's future that our young people be well educated.

To help promising students and small colleges, we and other American companies have taken steps to give financial aid. Standard Oil, for example, has made funds available which provide for 34 graduate fellowships and undergraduate scholarships in science and engineering. Four-year scholarships awarded through the National Merit Scholarship Corporation also are included in this program. Thirteen students now are attending school on these scholarships. Supplementary grants are made to schools chosen by the Merit Scholarship winners.

In addition, Standard Oil has made funds available from which $175,000 is paid yearly to aid privately-financed liberal arts colleges in the Midwest and Rocky Mountain states.

At Standard Oil, where so much of our planning concerns the future, we believe there are few things more vital to the survival of our democratic, free-enterprise system than a well-educated public. That's why we provide for substantial financial aid to both colleges and students.

Dr. Laurence M. Gould, president, Carleton College, Northfield, Minnesota: "If it were not for financial help from business organizations, many capable students would be denied a college education. The far-sighted companies giving this aid are helping to conserve one of our most valuable natural resources."

Charles Rieck of Chicago, National Merit Scholarship winner, and physics major at Notre Dame: "Business is helping to make it possible for many people to continue their education. Its concern for students and colleges shows a real long-range interest in national welfare."

What makes a company a good citizen?

One way of judging a company's citizenship is by its concern for the future—not for itself alone, but for the country as a whole. With business and colleges working together to build a stronger, more secure America through education, a brighter future is assured for us all.

STANDARD OIL COMPANY
(INDIANA)

STANDARD
THE SIGN OF PROGRESS...
THROUGH RESEARCH

CLASSIFIED

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Experienced Refinery Safety Engineer with ability and capacity to supervise Plant Security and Inaugurate Safety Program. Position at newly constructed independent oil company refinery at Sewaren, N. J. Send resume indicating experience, education, and salary requirement to Personnel Manager.

HESS TRADING & TRANSPORT, INC.
P.O. BOX 631
PERTH AMBOY, N. J.

ENGINEERS—TOOLPUSHERS

Well established International Drilling Contractor will soon have positions available as Resident Managers of foreign operations for Engineers with extensive field experience in drilling and managerial ability.

Engineers with Toolpushing experience preferred, but will consider Engineers with drilling experience.

Attractive salary and benefits. Training in Domestic Company before foreign assignment.

P-8789 PETROLEUM WEEK
520 N. Michigan Ave., Chicago 11, Ill.

INFORMATION ANALYST

To identify and digest pertinent literature and patents on petroleum refining and petrochemicals. Industry experience and experience or interest in the precise writing necessary for abstracting required. B.S. or M.S. in chemistry or chemical engineering, with a reading knowledge of one or more foreign languages. Opportunities for advancement into technical-publications work or other information activities. Salary commensurate with ability and experience.

Give full details of education, experience, desired salary and references. All inquiries will be considered promptly and held confidential.

Address replies to:
ESSO RESEARCH AND ENGINEERING COMPANY
(Chief Technical Affiliate—
Standard Oil Company (New Jersey))
Esso Research Center,
Employee Relations—J
P.O. Box 175, Linden, New Jersey

ADDITIONAL CLASSIFIED ADVERTISING

Continued on Page 108

DEPT/Personals

W. B. CLEVELAND, associated with Creole Petroleum Corp. for 20 years, has been elected a director of that company, in Caracas. He replaces **Dr. W. L. Butte,** who has resigned from Creole to accept an appointment as professor of law at the University of Texas. Butte will remain with the company as a general executive in Caracas until the end of this year. Cleveland left Creole last year to do special work with Standard Oil Co. (N. J.), and since then has been a member of the board of directors of Carter Oil Co., in Tulsa, in charge of production and research activities. His last previous post with Creole was as manager of the Amuay refinery, at Las Piedras.

S. Wire

J. E. Stoveken

JAMES E. STOVEKEN is assistant general manager of Esso Standard Oil Co.'s marine department, and **SYDNEY WIRE** succeeds him as manager of the inland waterways department. Wire was formerly secretary of Esso Shipping Co., ocean tanker affiliate of Standard Oil Co. (N. J.), whose operations were recently transferred into Esso's new marine department in New York.

DR. WILLIAM C. HAYES, JR., has been named assistant state geologist for the Missouri Geological Survey. He replaces **Dr. G. A. Muilenburg,** who is retiring. Hayes joined the Survey in 1956 as economic geologist.

JOHN H. ZANON is the new division accountant in the Denver office of The California Co. He succeeds **R. S. Rasbury,** who has been made assistant secretary and assistant treasurer of the company. Zanon's former position was head of the production accounting section in New Orleans.

C. H. BARRE has been named manager of Republic Oil Refining Co.'s Texas City (Tex.) refinery. He replaces **L. W. Robbie,** who has resigned. Barre's former position was coordinator of manufacturing. Robbie, besides being refinery manager, was manufacturing vice-president.

WILLIAM M. GRASS has been named eastern division purchasing agent for Tidewater Oil Co., in New York. Grass, assistant purchasing agent since February, succeeds **Arthur Jungdahl,** who has retired.

JOHN S. POYEN is the new assistant manager of the Edmonton division of Imperial Oil Ltd. He formerly was manager of the western region contracts and unitization department in Calgary. He is succeeded in Calgary by **John H. Hamlin,** former manager of the eastern division in London, Ont. In addition, **Kennedy R. Marble** is manager of the newly created department for directing and coordinating electronic data processing within the company's western Canadian producing department in Calgary.

FRANCIS E. HEATH is the new agent and chief geologist for Sun Oil Co.'s Southwest production division in Dallas according to **Sam M. Gladney,** division manager. Heath joined Sun as a geologist in 1926.

W. J. PRICE is the new manager of European operations for Loffland Brothers Co. His office will be located in The Hague, Holland.

CRAIG THOMPSON has been appointed director of public relations of Gulf Oil Corp., Pittsburgh. He succeeds **W. R. Huber,** who has retired. Craig has been a free lance writer since 1949. Previous to that, he was associated with Time Magazine as chief of its Moscow bureau.

JAMES S. PATTERSON became manufacturing superintendent of International Petroleum Co., Ltd., in Talara, Peru, on Sept. 15. Previously Patterson was assistant refinery manager for International at Barranca, Colombia.

JOHN W. TYNAN was promoted to production manager of Continental Oil Co.'s Rocky Mountain region, with headquarters in Denver. Tynan, regional engineer in Denver for the past three years, succeeds **J. C. Johnston,** who retired on Aug. 29. **Vance A. Knight** has become administrative assistant in Conoco's industrial relations department, in Houston. **C. E. Jester** succeeds Knight as Rocky Mountain industrial relations manager at Denver. He was formerly southern region industrial relations manager in Houston. **J. Frank Pieratt,** formerly director of the wage and salary administration division in Houston, succeeds Jester. **Winston J. Woellert** was promoted from assistant director to director of the wage and salary administration division, succeeding Pieratt.

JOHN R. McNULTY has been named to the new position of vice-president of industrial relations of Canadian Husky Oil Ltd., at Calgary. **Norman V. Lovett** succeeds McNulty as manager of industrial relations for Husky Oil Co., Cody, Wyo., and its marketing subsidiary, Husky Hi-Power, Inc. Lovett has been assistant manager of the department since 1955.

LOUIS J. BRUNEL, vice-president and general manager of Bishop Oil Co., San Francisco, has been elected a director of the company. Brunel is also president of Bishop's Canadian subsidiary, Canadian Bishop Oil, Ltd.

• *In the oil world Houston is* **FIRST CITY**

• *With oil men Houston's* **FIRST CITY** *National is first*

• Make friends now at the oil man's bank—
where you'll find officers with a practical
knowledge of your requirements.

FIRST CITY

NATIONAL **BANK** OF HOUSTON

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Oakite
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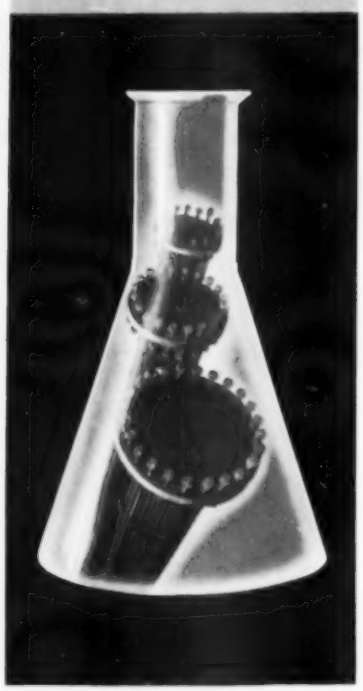


Best way
to clean a
tube bundle

ACTUAL JOBS prove that the best way to clean a tube bundle is the OAKITE ECP way... which recommends *chemical cleaning* by in-place *circulation* or by *tank-soak*. At one refinery, where crews hand scrubbed 60-tube, 12-foot bundles, the recommendation cut cost per bundle from $392 to only $120. An Oakite ENGINEERED CLEANING PROGRAM is developed specifically for your refinery, gives detailed recommendations for everything from coolers to crackers. The Oakite engineer sticks with the job till it's done to satisfaction. Along with his experience go products and methods developed by one of the finest chemical cleaning research facilities in existence.

Send for more data. Oakite Products, Inc., 39 Rector St., New York 6, N. Y.

OAKITE ECP your economy key
In our 50th year

DEPT/Letters

Underestimate

Dear Sir:

The investment estimate of $150 per bbl. for Octafining which you published in PETROLEUM WEEK (PW—Jul.4'58,p30) is far too low, and we would like to supply a more realistic figure.

For a 2,000 b/d Octafiner, including high-pressure system and fractionation, we would estimate an inside-battery investment of $450-$550 per bbl. of feed. The crystallizer is not included in this estimate.

J. H. MCCULLOUGH
ATLANTIC REFINING CO.
PHILADELPHIA, PA.

Wrong University

Dear Sir:

I would like to call your attention to an error in PETROLEUM WEEK. In referring to a statistical study of a sample area in the Denver-Julesburg Basin (PW—Aug.22'58,p16), which was made by J. J. Arps, of British-American Oil Producing Co. and myself, you state that I am "of the University of Kentucky."

Mr. Arps and I are both with British-American Oil Producing Co. I am a 1950 graduate of the University of Oklahoma, and have never been at the University of Kentucky.

T. G. ROBERTS
BRITISH-AMERICAN OIL
PRODUCING CO.
DALLAS, TEX.

Our apologies to Mr. Roberts. Since our source material did not identify him, we checked the directory of the American Assn. of Petroleum Geologists, which lists a Thomas G. Roberts at the University of Kentucky. We erroneously assumed that the two were the same person.

Remarkable Record

Dear Sir:

It is with a great deal of interest that the writer read the article on the quadruple completion for CATC's No. 8C State Lease, 12 mi. off Plaquemines Parish in the Gulf of Mexico (PW—Aug.1'58,p22). But we were disappointed that no mention was made of Loomis Hydraulic Testing Co., which hydraulically tested each joint of tubing as it was run in the hole.

We note that you mentioned the packer people, the cementing people, the people who made the Christmas tree, and the drilling contractor, so we are wondering why we were overlooked.

For your information, we have been in business for seven years, and are approaching our two-millionth test. We believe that we have tested 80% of all the tubing run in wells of 14,000 ft. or deeper in the Louisiana-Gulf Coast area.

J. P. KING, SR.
SECRETARY-TREASURER
LOOMIS HYDRAULIC TESTING CO.
MC ALLEN, TEX.

Orchids

Dear Sir:

Your editorial of Aug. 15 is extremely interesting and well presented.

As a matter of fact, I can't find a thing in the world in it with which to disagree.

W. E. TURNER
EXECUTIVE VICE-PRESIDENT
TEXAS INDEPENDENT PRODUCERS
& ROYALTY OWNERS ASSN.
AUSTIN, TEX.

Dear Sir:

Thanks for your snappy "Inside Slant" (PW—Aug.15'58,p15), adding your voice to that of W. K. Whiteford and others in pointing up the inconsistencies and absurdities of most actions of the Justice Dept.

RALPH O. DIETLER
TULSA, OKLA.

Dear Sir:

The "Inside Slant" on page 16 of your July 25 PETROLEUM WEEK is the most sensible article I have read for a long time in any publication.

For the past year, when asked what is going to happen to the oil industry, my answers and comments have been exactly along the lines covered by you in the above-mentioned, concise editorial.

T. C. SULLIVAN
VICE-PRESIDENT
ADA OIL CO.
HOUSTON, TEX.

PETROLEUM WEEK will publish from time to time comments from readers on timely, pertinent subjects. Expressions of opinions are welcomed; they should be kept as brief as possible.

Address all such correspondence to LeRoy Menzing, Editor, PETROLEUM WEEK, 330 W. 42nd St., New York 36, N. Y.

THE MOST EFFECTIVE FRACTURING FORCE IN THE OIL FIELDS!

OIL WELL SERVICES

BJ Service

A BORG-WARNER SUBSIDIARY

Mid-Continent • Gulf Coast • Permian Basin • Rocky Mountain • California

Results Talk!

HERE'S WHY BJ SERVICE GETS RESULTS FOR YOU

Every man on the job knows local conditions like the top of his boot. He is a part of a team that makes tough jobs go like routine runs. He knows his equipment better than he knows his own car...dependable, up-to-the-minute equipment and products that make BJ Service the most effective fracturing force in the oil fields! On the job, his experience pays off in results. Get this unbeatable combination of men, materials and equipment on your next frac job...call BJ Service!

The Model 114-T high-pressure 15,000 psi unit designed and built by BJ Service.

Major research and development programs keep our equipment years ahead.

GEOFRAC 5 and 15

An excellent sand carrying fluid. Combines benefits of fracturing and acidizing. Assures deep fracture extension due to its viscosity, low fluid loss and good temperature stability. Will not return sand from the fracture.

OILFRAC

A sand-oil frac fluid which makes use of refined oils or unemulsified and ungelled lease crude. Fluid loss additives may be included.

80 barrel-per-minute BJ Service sand-oil blender custom designed and built in our own shops.

AUXILIARY SERVICES

AQUAFRAC

Low cost frac fluid with lower sand settling rate, lower fluid loss and fewer screen-outs as compared to water. Agents may be added to help prevent emulsions, water block and clay swelling. Dissolves salt deposits in formation.

T-O FRAC

The ideal frac fluid where chemical action is not required. Excellent sand carrying ability. Has lowest friction loss of the fracturing fluids. Excellent for high injection rate. Inexpensive to use where lease crude is available. Crude returned as pipeline oil.

[illegible]

Permits acidizing or fracturing fluids to treat less permeable zones. Seals leaking packers and stops communication between perforated intervals during stimulation. Can be used with bottom-hole temperatures up to 220° F.

SELECTOJET

Temporarily blocks zones opened before or during stimulation and forces acid or frac fluid to penetrate new zones. Selected and graded-to-size granular material gives better blocking action. Remains in pumpable condition throughout treatment.

GELLED WATER

An efficient, safe fracturing fluid for water producing, injection and disposal wells. Low fluid loss, good sand carrying ability. Internal breaker thins gel within a few hours. Inexpensive and effective for fracture extension.

OIL WELL SERVICES

BJ Service

A BORG-WARNER SUBSIDIARY

SELECT-O-BALLS

Rubber, nylon or rubber-covered nylon balls act as "check-valves" to shut off fluid flow through open perforations. Direct frac or acid fluid into tighter portions of perforated interval. Eliminate costly bridge plugs in multiple treatments.

[illegible]

An effective sub-surface tool developed by BJ Service to break down extremely tight formations. Adds almost instantaneous 5,000 hydraulic hp booster to frac fluid right at the zone being treated. Creates multiple fractures in open hole completions and more fractures in any formation.

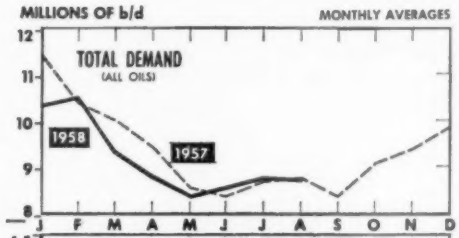
BJ SERVICE, INC.

A BORG-WARNER SUBSIDIARY

LONG BEACH, CALIFORNIA • FORT WORTH, TEXAS / *Stations throughout Mid-Continent, Gulf Coast, Permian Basin, Rocky Mountain and California*

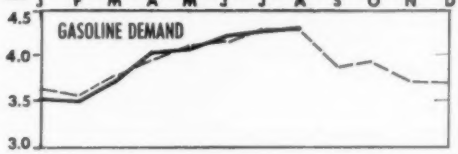
PETROLEUM WEEK'S

Fingertip Figures



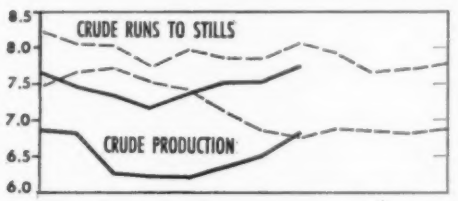
TOTAL DEMAND

Latest week average	8.635
Year ago	8.596



GASOLINE DEMAND

Latest 4-week average	4.227
Year ago	4.130

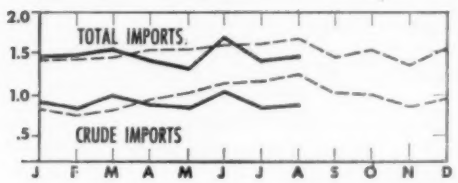


RUNS TO STILLS

Latest week	7.845
Previous week	7.982
Year ago	8.056

CRUDE PRODUCTION

Latest week	7.009
Previous week	7.060
Year ago	6.821

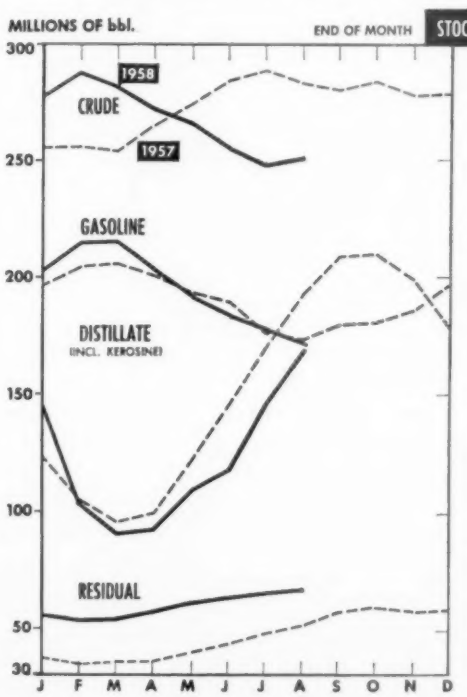


TOTAL IMPORTS

Latest week	1.277
Previous week	1.391
Year ago	1.331

CRUDE IMPORTS

Latest week	.670
Previous week	.901
Year ago	.968



CRUDE STOCKS

Week-ended 9-6	243.3
Previous week	246.7
Year ago	282.5

GASOLINE

Latest week	172.9
Previous week	174.2
Year ago	173.8

DISTILLATES

Latest week	175.7
Previous week	170.1
Year ago	198.9

RESIDUAL

Latest week	68.4
Previous week	68.1
Year ago	55.2

There is little or no chance that the imbalance in gasoline inventories will be corrected before next summer—if then.

Present indications are that gasoline demand in September will be a little better than normal. A good demand in September could go a long way towards correcting top-heavy stocks if refinery output were held down. But there is little chance of that.

The reason is that under the proposed import plan, quotas to be assigned to individual companies for the last half of 1959 will be based on average refinery runs for the 12 months ending next Mar. 31.

Refinery operating rates in the first five months of the new "base" period—April through August—have been about 5% under last year.

That means that refiners now have seven months remaining to create a high run "history" on which to base their import allocations.

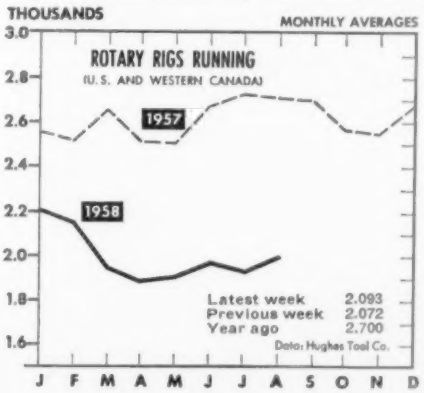
The anticipated high runs in the areas east of the Rockies to be covered by the import plan will add needless volume to the already surplus gasoline stocks, no matter how low gasoline yields are held.

Despite all the talk so far about reducing refinery runs and trimming gasoline yields, current statistics show that runs are higher than they were before a dozen or so refiners announced "cutbacks."

Current runs are 132,000 b/d above a month ago, nationwide. East of the Rockies, refiners are running 52,000 b/d more than a month ago.

Current gasoline yields, at 51%, are still running close to the all-time record of 53% set in July.

During the last four months of last year, refinery runs averaged only 7,769,000 b/d —much lower than is expected for the remainder of 1958. Then, with gasoline yield at 50% and demand at 3,810,000 b/d, gasoline stocks rose by 22.7-million bbl.



The Market Trend

Natural Gasoline: Will Prices Rise?

Natural gasoline manufacturers have been talking a price advance for several months now. But, as with the weather, nobody has done anything about it. Early in the summer, sellers said natural prices would go up as soon as motor gasoline prices stiffened. But motor fuel prices rose and natural prices stood still. Then propane contract prices shot up, with butane quotations following, and again natural gasoline was expected to rise in price. Again it didn't.

Traditionally, natural gasoline prices have gone down in the spring and up in the fall. Last spring, however, didn't see the usual price dip. Current prices have been in effect since last December. However, the market is very thin: There hasn't been a spot sale since March.

As far as demand is concerned, sellers say natural gasoline prices could have gone up long ago. With the exception of some soft spots on the Gulf Coast, natural gasoline supplies are snug, in the Group 3 area particularly.

The main deterrent to a price advance now is the large "left over" inventory of gasoline at the end of the big consuming season. How much of it in refiners' hands is unfinished product no one knows. Guestimates vary all the way from midnight to noon.

Natural gasoline's price position in relation to LP-gas has done an about-face. Group 3 contract price for propane now is 5¢ gal., while grade 26-70 price, based on last reported spot sale, is 4.5¢ gal. Four years ago propane was going on contract at 3.5¢, Group 3, while 26-70 was selling at 5¢.

Natural gasoline manufacturers could use the additional 0.5¢ a gal. they feel they could be getting. But they don't want to kill the goose either. In the octane race of recent years, natural gasoline has lost much of its value to refiners.

Wanted—Lubes: Argentina came into the market for 19.8-million gal. of lubes for delivery during the first nine months of next year, all in bulk. Its last lube tender (in February, for 14.6-million gal.) was heavily subscribed, with bids from 20 suppliers. Dollar-short Argentina gave that business to Shell Petroleum, with payment in sterling.

Step Forward: Another company to take a step in the forward integration direction is Tennessee Gas Transmission. Its purchase of Hartol Petroleum gives it an entering wedge into northeastern marketing territory. Hartol markets gasoline and distillate fuel from the New England area to Wilmington, N. C. Last year Tennessee Gas bought 75 stations in the southeast from Citizens Oil Co. These are being operated by Bay Petroleum, a TGT subsidiary.

Tanker Tally: The number of tankers laid-up or idle shows a drop of 62 since mid-July —but scrapping accounts for 40 of those. Of the total of 328 now out of service, 41 fly the U. S. flag, totaling 651,148 tons. Tankers on order or building in U. S. shipyards come to 62, with 45,500-47,800 tons still the most popular size range.

You'll find what you want in bearings of

ALCOA ALUMINUM ALLOY

Ability to carry heavy loads . . . up to 10,000 psi on projected area.

Cooler Running . . . Aluminum is the best heat conductor among bearing materials, thus runs cooler . . . as much as 20° by actual test.

Good Conformability . . . Aluminum has good ductility, conforms readily to misalignment of shafts or nonparallel pins.

Ideal Embeddability . . . Aluminum embeds particles better than bronze, not as deeply as babbitt; dirt particles roll out easily and are trapped by filter.

Corrosion Resistance . . . Aluminum resists corrosion, is unaffected by additives in oils, needs no protective coating.

Design Flexibility . . . Aluminum has it; structural properties allow for greater flexibility in design . . . ease of machinability, too!

For more information on the unmatched combination of advantages in solid aluminum alloy bearings, call your nearest Alcoa sales office. Or, write to Aluminum Company of America, 1922-J Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM BEARINGS

Your Guide to the Best in Aluminum Value

"ALCOA THEATRE"
Exciting Adventure
Alternate Monday Evenings

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All Prices as of September 12

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....12.25-12.875
- Gasoline, 92 oct reg....11-11.5
- Kerosine....8.875-9.125
- Heating oil, No. 2....8.625-9
- Gas oil, 48-52 d.i....8.875-9.5
- Fuel oil, bunker "C"....$2.25-2.40

Caribbean, cargoes
- Avgas, Grade 100/130....16
- Gasoline, 93 oct research prem....11.25
- Gasoline, 87 oct research reg....10.375
- Gasoline, 79 oct research....9.625
- Gasoline, 70-72 oct motor method....9.5
- Kerosine....9.125
- Heating oil, No. 2....8.625
- Gas oil, 48-52 d.i....8.875
- Fuel oil, bunker "C"....$2.25

New York Harbor, barges
- Kerosine....9.95-10.2
- Heating oil, No. 2....9.45-9.7
- Fuel oil, No. 6....$2.57-2.65

Okla-Group 3, northern shpt., bulk
- Gasoline, 89 oct reg....12-12.75
- Kerosine....10-10.5
- Heating oil, No. 2....9
- Fuel oil, No. 6....$1.30-1.45

Chicago, bulk
- Gasoline, 91 oct reg....12.25
- Heating oil, No. 2....9.5-11.35
- Fuel oil, No. 6 high sulfur....6.65-6.75

Los Angeles, rack
- Gasoline, 88 oct reg....13-13.6
- Diesel fuel, PS 200....10-11.25
- Light fuel, PS 300....$3.05
- Heavy fuel, PS 400....$2.50-2.70

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....5

Pennsylvania Lubes
- Bright stock, 25 p.t....22
- 200 vis. neutral, 25 p.t....21

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent 95 v. i....23-24
- Neutral, solvent, 200-210 vis....19.5-20.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v. i....24
- Neutral, solvent, 200 vis....20.5

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130....17.25
- Gasoline, 79 oct research....10.375
- Kerosine....10.375
- Gas oil, 48 d. i. minimum....10.25

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9....2.83-3.07
- North Dakota, 36.0-36.9....3.07
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00-3.07
  - West Texas, N. M., inter., 36.0-36.9....3.00
  - West Texas, N. M., sour, 32.0-32.9....2.86
  - East Texas, flat....3.25
  - Mirando, 28.0-28.9....3.31
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....3.90
- California, Signal Hill, 21.0-21.9....2.63-2.73†
- North Louisiana-Arkansas, 36.0-36.9....2.82-3.02
- Wyoming, sweet, 36.0-36.9....2.90-3.00
- Wyoming, sour, 32.0-32.9....2.71

Canada (flat prices, at the well)
- Acheson-Stony Plain (Alta.)....2.61
- Leduc-Woodbend (Alta.)....2.67
- Redwater (Alta.)....2.56
- Daly (Man.)....2.39
- Smiley (Sask.)....2.33

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 48.0-48.9, Tucupido....3.75
- San Joaquin, 41.0-41.9, Puerto la Cruz....3.34
- Oficina, 35.0-35.9, Puerto la Cruz....3.05
- Tia Juana, Medium, 26.0-26.9, Amuay....2.55
- Bachaquero, flat, Las Piedras....2.03-2.08
- Tarra, 38.0-38.9, San Lorenzo....3.08
- Lagunillas Heavy, flat, Cardon....2.25

†*Differential per deg. of grav. varies.*

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....2.08
- **Safaniya, 27.0-27.9, Ras Tanura....1.65↓**
- Iran, 34.0-34.9, Bandar Mashur....2.04
- Iran, 34.0-34.9, Abadan....1.99
- Iraq, 35.0-35.9, Fao....1.98
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.85
- Qatar, 41.0-41.9, Umm Said....2.23
- Neutral Zone, Burghan, 23.5-24.4, Mina Saud....1.61
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud...1.43

Middle East, Eastern Mediterranean
- Arabian, 36.0-36.9, Sidon....2.49
- Iraqi, 36.0-36.9, Tripoli, Banias....2.49

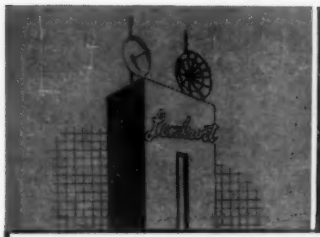
Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, 37-38....2.75

KEY TANKER RATES

(Last pair, per long ton, single voyage)

U.S. Gulf-New York, clean. (USMC +15%) $3.28†
U.S. Gulf-New York, dirty....(USMC —10%) $2.56
NWI-USNH, dirty....(USMC —42½%) $1.55†
NWI-UK/Cont., dirty....(Scale —50%) 16/3*†
Persian Gulf-UK/Cont., dirty....(Scale —55%) 27/9*
Persian Gulf-USNH, dirty....(USMC —60%) $5.08

**Sterling.*



Lenkurt

FOR ALL YOUR CARRIER AND MICROWAVE NEEDS

LENKURT CARRIER TELEPHONE SYSTEMS

FOR OPEN-WIRE LINES

Type 33 A
A low frequency, one-to-three channel, stackable carrier system. Primarily for short or medium haul circuits.

Type 45 A
A miniaturized, 12-channel, high frequency carrier. Economical enough for short haul, good enough for long haul circuits.

Type 45 C
A miniaturized, 16-channel system. Stackable in 4 channel groups, each with its own common and channel equipment. Available systems: CA, CB, CC, and CD.

FOR SUBSCRIBER LINES

Panhandle FM Carrier—
Extends the economies of carrier to subscriber lines. Add up to 100 subscribers without additional wire construction with this 10-channel system.

FOR RADIO

Type 33 B/C
Providing 1 to 24 channels for low capacity radio systems.

Type 45 BX
A miniaturized system providing up to 240 channels for transmission over radio circuits. Interconnectible with other 45-class systems.

FOR CABLE

Type 45 BN
A miniaturized 24-channel system for cable circuits. Interconnects with other systems of the 45-class.

LENKURT CARRIER TELEGRAPH SYSTEMS

Type 22 A
An FM carrier telegraph system using frequency shift keying. Minimizes "cross-fire", noise and static. Up to 18 full- or half-duplex channels on one voice circuit.

Type 24 C
An economical AM carrier using on-off keying. Provides 18 high-quality channels.

LENKURT TELEMETERING AND REMOTE CONTROL SYSTEMS

Type 440/444
Carrier signaling equipment for telemetering, dial signaling, remote control, supervision or alarm functions.

Type 51 B
Remote control, supervision and alarm system for handling large numbers of functions over very few signaling circuits.

COMPANDOR

Type 5090 B
Boosts signal-to-noise ratio as much as 22db. Saves circuits otherwise unsuitable because of excessive line noise or crosstalk.

RADIO SYSTEMS

MICROTEL Type 74 A
A wide-band FM microwave system providing up to 240 channels in the 6000 mc region.

For complete details on any of these Lenkurt systems or products write:
Automatic Electric Sales Corporation, Northlake, Illinois. *Offices in principal cities.*

AUTOMATIC ELECTRIC

Northlake, Illinois

Subsidiary of GENERAL TELEPHONE

DEPT/Service & Equipment Companies

BOLLING A. ABERCROMBIE has been appointed assistant to the vice-president of engineering of Garrett Oil Tools Inc., division of U. S. Industries, Inc. Abercrombie, formerly a sales engineer in the company's Houston district, moves to Garrett's home office at Longview, Tex.

W. G. Johnson

B. A. Abercrombie

WALTER G. JOHNSON has been appointed general manager of the Union Tank division of Butler Mfg. Co., with offices in Houston. He has been vice-president and general manager of Butler Mfg. Co., Ltd., Canada, since 1955.

MACCO CORP., Paramount, Calif., has opened an office in Seward, Alaska, for the distribution of its drilling mud materials.

WILLIAM L. HENDERSON was named sales engineer at Lafayette, La., for ALCO Products, Inc. For the past year, Henderson has attended the School of Drilling Technology in Odessa, and has trained at ALCO plants in the field. **C. P. Gillespie,** sales representative, has been transferred from Lafayette to Houma, La.

J. B. ALLINSON has been named regional sales representative for Southwestern Engineering Co. in the Mid-Continent and Southwest. Allinson, with offices in Dallas, will represent the engineering and construction division, which designs, engineers, and builds plants for the process industries.

WILLIAM P. KESEL will become export manager of Hewitt-Robins, Inc., Stamford, Conn., on Sept. 30. He succeeds **J. J. Murray,** who retires on that date but continues as a consultant to the company. Kesel, assistant export manager since 1957, will be responsible to **J. J. Sheehan,** manager of Hewitt-Robins' international division.

WILLIAM I. WOODSON has been named general manager of Venezuelan operations in the newly established Caracas office of the international division of Graver Tank & Mfg. Co. Woodson formerly served as manager of the Venezuelan division of Texas Petroleum Co. **Erwin C. Barnes,** a Graver field engineer with overseas experience, becomes Woodson's assistant.

HOMER S. PERRY and **DAVE R. TOMLIN** are new sales representatives for BJ Service, Inc. Perry will be located in the Hill City (Kan.) area, and Tomlin in the Four Corners area, with offices in Farmington, N. M. Perry formerly served 13 years with Chemical Process Co., recently merged with BJ Service.

R. E. KILLION was named district superintendent at McAllen, Tex., for the drilling mud department of the Baroid division of National Lead Co. He was formerly a department sales representative in Houston.

WILBUR E. COMBS has been named manager of development for the mechanical goods division of United States Rubber Co., at Passaic, N. J. He will retain his former responsibilities as manager of market research at the company's Passaic plant.

C. E. LAMAR has been named assistant manager of Southern Pipe & Casing Co., Azusa, Calif., a division of U. S. Industries, Inc. He has been in engineering and sales at Southern Pipe for seven years.

JULES KOVACS, vice-president of Purolator Products, Inc., Rahway, N. J., has been placed in charge of technical sales, and **H. C. MOUWEN** has been named manager of the company's research and development department. Kovacs' new position includes new product marketing and special engineering services, while Mouwen will be responsible for new product development in filtration and separation. Kovacs joined Purolator in 1929 as a design engineer, and has been vice-president in charge of research and development

ADVERTISERS IN THIS ISSUE

Aluminum Company of America	103
Armour Chem. Div., Armour & Co.	84-85
Assn. of Ship Brokers & Agents, Inc.	30
Automatic Electric Co.	105
Beaird Co., Inc., The J. B.	73
B-J Service, Inc.— Subsid. Borg-Warner Corp.	99-100
Blyth & Co., Inc.	30
Brown & Root, Inc.	23
Bryton Chemical Co.	50
Cameron Iron Works	8
Chotin Towing Corp.	88
Continental-Emsco Co.	21
Davison Chemical Co.	71
Delhi-Taylor Oil Co.	59
Dowell	Cover 3
Drilling Specialties Co.	36
Eastman Chem. Prods., Inc.	11
Enjay Co., Inc.	45
Esso Research & Engr. Co.	68
Ethyl Corp.	12
Ever-Tite Coupling Co., Inc.	2
First City Nat'l. Bank of Houston	97
First National Bank in Dallas	Cover 2
Fish Engineering Co.	7
Foster Wheeler Corp.	79
Foxboro Co.	107
Gates Rubber Co., The	109
General Controls Co.	87
Goodyear Tire & Rubber Co., Inc.	1
Graver Tank & Mfg. Co., Inc.	6
Houdry Process Corp.	76
Hudson Engineering Co.	54-55
Ingersoll-Rand Co.	67
Jefferson Chemical Co.	93
Kellogg Co., M. W.	Cover 4
Le Tourneau, Inc., R. G.	39
Liberty Manufacturing Co.	29
Marquard & Bahls, G.m.b.H.	81
Metals Disintegrating Co.	28
Milwhite Mud Sales Co.	27
Oakite Prods., Inc.	98
Olin Mathieson Chem. Corp.	72
Oronite Chemical Co.	49
Parkersburg Rig & Reel Co.	33
Petreco Div., Petrolite Corp.	77
Polyken Prods. Div., Kendall Co.	89
Price Co., H. C.	17
Pritchard & Co., J. F.	60
Procon, Inc.	75
Refinery Engineering Co.	4
Republic Nat'l. Bank of Dallas	3
Reynolds Metals Co.	40-41
Rhodia, Inc.	56
Scientific Design Co., Inc.	63
Scott-Rice Co.	108
Solar Aircraft Co.	81
Southwest Industries	34-35
Std. Oil Co. of California	31
Standard Oil Co. (Indiana)	95
Sun Shipbuilding & Dry Dock Co.	5
Thompson Tank & Mfg. Co.	94
Tretolite Div., Petrolite Corp.	64
United States Steel Corp.	91
Universal Oil Products Co.	19
Vogt Machine Co., Henry	53
Warren Petroleum Corp.	20
Western Supply Co.	74
Wilfley & Sons, Inc., A. R.	46

Classified Advertising
F. J. Eberle, Business Mgr.

Business Opportunities	96, 108
Employment Opportunities	96, 108
EQUIPMENT Used or Surplus New For Sale	96, 108

PETROLEUM WEEK REPRESENTATIVES

Atlanta 3 — Douglas C. Billian
1301 Rhodes-Haverty Bldg.
Jackson 3-6951

Boston 6 — Donald R. Thompson
350 Park Square Bldg.
Hubbard 2-7160

Chicago 11 — Edward A. Callahan Jr.
520 North Michigan Avenue
Mohawk 4-5800

Cleveland 15 — J. E. MacArthur
1164 Illuminating Bldg.
55 Public Square
Superior 1-7000

Denver 2 — J. W. Patten
Mile High Center, 1740 Broadway
Alpine 5-2981

Houston 25 — D. O. Hanson
724 Prudential Bldg.
Jackson 6-1281

Los Angeles 17 — Peter S. Carberry
1125 W. Sixth St.
Huntley 2-5450

New York 36 — Donald R. Thompson
500 Fifth Ave.
Oxford 5-5959

Philadelphia 3 — W. A. Potter
6 Penn Center Plaza
Rittenhouse 6-0670

San Francisco 4 — William C. Woolston
68 Post Street
Douglas 2-4600

Tulsa 3 — J. A. Hartley
909 Enterprise Bldg.
522 South Boston
Gibson 7-5594

England, London E. C. 4 — E. E. Schirmer
McGraw-Hill Co., Ltd.
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Individual calibration of a Dynalog — an exclusive Foxboro electronic instrument that gives closer potentiometer measurement and control of temperature and other process variables.

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REG. U.S. PAT. OFF.

Creative Design and Manufacture of Instruments and Instrument Systems for Measurement and Control of Process Variables. The Foxboro Company, Foxboro, Mass., U. S. A.

CLASSIFIED

(Continued from Page 96)

OPENING FOR PROCESS SUPERINTENDENT

New Refinery at Sewaren, N. J. has opening for a Process Superintendent. Excellent opportunity for experienced individual who has ambition and ability. Applicant should have ten years refinery operating experience. Chemical engineering education preferred. All replies handled in confidence. Salary commensurate with ability and experience. Forward resume describing work history, education, and salary desired to:

MR. LEON HESS
HESS TRADING & TRANSPORT, INC.
P.O. BOX 631, PERTH AMBOY, N. J.

OPPORTUNITY FOR REFINERY MANAGER

Unusual opportunity at our new Sewaren, New Jersey refinery for a seasoned Refining Executive who has had at least ten years operating and administrative experience. Must have initiative, drive, and capacity to direct all phases of complete 45,000 b/d refinery operation. Petroleum or chemical engineering background preferred. All information confidential. Salary commensurate with ability and experience. Forward resume describing education, operating experience, and salary requirement to:

MR. LEON HESS
HESS TRADING & TRANSPORT, INC.
P.O. BOX 631, PERTH AMBOY, N. J.

OPENING FOR REFINERY SHIFT FOREMAN

Newly constructed Oil Refinery at Sewaren, N. J. has opening for several Shift Foremen. Applicants must be experienced in supervising hourly employees working on refinery units and have general knowledge of Processing Operations and Refinery Equipment. All information confidential. Salary commensurate with ability and experience. Forward resume to Personnel Manager indicating work experience, education, and salary requirement.

HESS TRADING & TRANSPORT, INC.
P.O. BOX 631
PERTH AMBOY, N. J.

OPENING FOR LEAD BLENDER—REFINERY

Independent oil company refinery at Sewaren, N. J. has opening for a Gasoline Blender. Must be experienced in refinery blending of gasoline, including tetra-ethyl lead, and additive blending. Send resume to Personnel Manager.

HESS TRADING & TRANSPORT, INC.
P.O. BOX 631
PERTH AMBOY, N. J.

OPPORTUNITY FOR REFINERY ACCOUNTANT

Opening for Refinery Accountant. We have an excellent opportunity for Senior Accountant to be in charge of all refinery accounting. This is an opportunity for experienced accountant who has initiative, ambition, and ability. Applicant should have refinery or similar accounting experience. All replies kept in confidence. Salary commensurate with ability and experience. Forward resume describing work history, education, and salary requirement to:

MR. LEON HESS
HESS TRADING & TRANSPORT, INC.
P.O. BOX 631, PERTH AMBOY, N. J.

OPENINGS FOR REFINERY-INSTRUMENT MECHANICS

Newly constructed independent oil company refinery at Sewaren, N. J. has openings for Instrument Mechanics. Applicants must be experienced and capable of servicing and maintaining pneumatic, mechanical, electrical and electronic equipment. Send resume to Personnel Manager.

HESS TRADING & TRANSPORT, INC.
P.O. BOX 631
PERTH AMBOY, NEW JERSEY

POSITIONS WANTED

Seismologist, 7 years world-wide experience, 4 languages, wants foreign assignment Venezuela or Europe. PW-8771, Petroleum Week.

Records Files Administrative Asst., young woman, 34, geology major 6 years experience records files library management latest with nationally known mgt. consulting firm. Desires position in petroleum industry, single, willing to travel or relocate. PW-8885, Petroleum Week.

BUSINESS OPPORTUNITY

For drilling deals in Texas, contact Ogden Oil Company, P. O. Box 464, Ph. EL 23353, Taylor, Texas.

FOR SALE

For Sale—100,000 Ft. 10" 40# Line Pipe Beveled, ready for use—located Cisco Texas. Contact Toland & Reeves—Box 4336, Oklahoma City, Oklahoma.

since 1950. Mouwen was formerly assistant director of research and development.

R. E. HARDY has been appointed sales representative in the Fort Worth-Dallas area for Mission Mfg. Co., with headquarters at Dallas. **Joe Young** is field sales representative in the Tri-State area, with headquarters in Illinois. He was formerly located in Oklahoma City.

EDWARD H. GLASCOCK has joined the White Diesel Engine division of White Motor Co. as sales representative in the New Orleans region, which includes Louisiana, Southern Arkansas, Mississippi, and Alabama. He will be responsible for sales to the oil field, marine, industrial, and municipal markets.

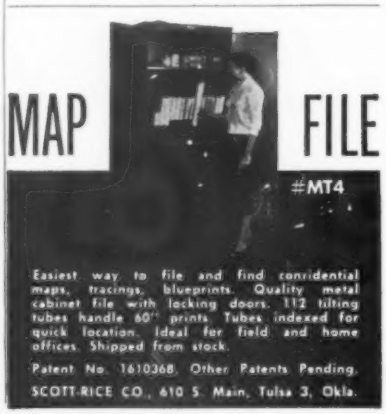
E. H. Glascock

H. V. Bootes

HENRY V. BOOTES has been appointed president of the Shippers' Car Line division of ACF Industries, Inc., New York, succeeding **Harry J. Leddy,** who is retiring. Bootes has been the division executive vice-president since February.

HOWARD J. EVANS was promoted to manager of engineering and research for gas products in the meter and valve division of Rockwell Mfg. Co., with offices in Du Bois, Pa. He has been chief engineer of central gas products since 1954. Evans will be associated with engineering, research, and development programs at Rockwell plants in Norwalk, Ohio, Tulsa, Statesboro, Ga., Potterville, Calif., and Guelph, Ont.

W. C. WADSWORTH has joined Norvell-Wilder Supply Co. as assistant to **John T. Knight, Jr.,** manager of the Tulsa sales office. Wadsworth was formerly a sales representative in the Tulsa territory for a valve manufacturer.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Easiest way to file and find confidential maps, tracings, blueprints. Quality metal cabinet file with locking doors. 112 tilting tubes handle 60" prints. Tubes indexed for quick location. Ideal for field and home offices. Shipped from stock.
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You find Gates Hose where anything flows

Mackinac Bridge, world's longest suspension bridge, connects upper and lower peninsulas of Michigan. Because reliability of equipment is an important factor in the grouting operations, Gates Water and Air Hoses were used.

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Gates Air Hose helps build bridge "that couldn't be built"

TPA 304

Industry everywhere depends upon Gates Industrial Hose to provide air, water, steam, oil and suction for every type of application, including some of the toughest jobs in the world.

Actually there are *tens of thousands of miles* of Gates Hose in daily use — every type and size from air hose the diameter of a pencil to petroleum hose as big as the mains in city streets.

Back of the world-wide acceptance of Gates Hose is a continuing program of *specialized* hose research at the multi-million dollar Gates Research Center staffed by more than 200 chemists, physicists, engineers and technicians.

It is the aim of this *specialized* research to increase hose utility and life, and to lower industry's annual hose costs.

Because Gates Hose is so widely preferred, it is quickly available from leading distributors in all industrial centers in the United States and in 90 countries throughout the world . . . and its outstanding performance is guaranteed by the *World's Largest Maker of V-Belts.*

Gates 18HB Air Hose, with oil resistant tube and abrasion resistant cover, gives exceptional performance on all heavy duty air usage. This popular hose — one of many in Gates full line — is always available from your nearby Gates Distributor.

The Mark of Specialized Research

Gates

The Gates Rubber Company • Denver, Colorado

Gates Industrial Hose

Made in a Full Range of Types and Sizes

A Bold Step, Well Taken

AN ACTIVE INTEREST IN PRACTICAL POLITICS will be taken by Gulf Oil Corp. Among other things, the company, in an open letter to its employees and stockholders, urges that each individual keep informed on the current matters before Congress and observe the voting records on legislation of their elected representatives.

For its own part as a corporate citizen, Gulf intends to make a "continuous study of the official behavior of elected officials." Information on such behavior will be distributed by states and congressional districts to serve, in each area, as a nucleus of fact around which a program of action may be developed.

Gulf says its reason for taking such a move is the rise of the political power of top union officials. "If we are to survive," the company stated, "labor's political power must now be opposed by a matching force, and there is no place in the U.S. where such a force can be generated except among the corporations that make up American business."

UNDOUBTEDLY GULF WILL BE CRITICIZED for its actions. Any time the oil industry, or an oil company, openly supports a particular candidate for office—or opposes any candidate—it is accused of using "oil millions" to influence the voting public. The popular phrase is "the oil lobby."

Admittedly, Gulf will be walking on touchy ground. The total vote of all of the employees in the oil industry doesn't equal the strength of the "union vote" or the "farm bloc," just to cite a couple of possible examples. It is almost assured that Gulf's announcement of its intentions will be used against the company by numerous politicians.

It would be rather stupid to assume that Gulf can tell any of its employees how to vote, or that the employees would vote the way the employer suggested. Fortunately for both parties—employee and employer—there is a secret ballot in this country.

Gulf is to be congratulated for its stand. The company announced its intentions publicly and stated how it would go about trying to accomplish its objective: through the dissemination of factual political information.

The corporate citizen should have every right and privilege of private citizens. And certainly it should have every right and privilege of organized groups of citizens with an interest in government.

FREFLO*— a mixture of oil-soluble chemicals designed to remove water blocks in oil and gas wells — by reducing surface tension, attacking interfacial tension and breaking emulsions. 10-gallon drum contains enough for 1000 gallons of treating solution. Available at Dowell stations.

CORBAN*— a complete line of polar-type inhibitors to combat corrosion in oil and gas wells. Available in a number of formulas and concentrations, in both liquid and stick form. Corban is supplied in 10, 20 and 50-gallon drums and in bulk lots at Dowell stations.

MUDBAN*— a non-acid, mud-dispersing agent for removing filter cake from the face of formations, for removing mud lost in formations, and for freeing stuck drill pipe. Recommended for clean-up treatments. Sold in 10-gallon steel drums at Dowell stations

GYPBAN*— a complex phosphate sequestering agent for prolonged protection from production-restricting gyp accumulations— in the formation and on well equipment. Non-toxic and oil-insoluble. Available at Dowell stations in 50-pound fiber cartons.

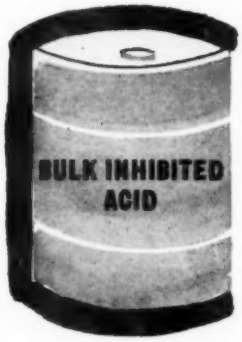
DOWELL

family of products for the oil fields

The Dowell label is your assurance of a quality product. For detailed information and prompt service, call any of the 165 Dowell stations and offices. In Canada, call Dowell of Canada, Ltd.; in Venezuela, contact United Oilwell Service. Dowell, Tulsa 1, Oklahoma.

*Dowell Trademark

JELFLAKE*— a fragmented, plastic foil added to drilling muds or cement slurries to prevent or stop lost circulation. Particles vary in size for more effectiveness. Packed in strong, wet-proof bags. Available at major mud distributors and Dowell stations.



BULK INHIBITED HYDROCHLORIC ACID — has many uses, including: cleaning scale and gyp from producing formations, tubing and lead lines; cleaning scale from piping, engine jackets, heat exchangers, valves and fittings; dump-job treatments in old wells. Supplied in bulk lots at Dowell stations.

POLYDRIL*— an organic, water-soluble polymer used in clear water drilling for rapid settling of solids. It has increased drilling rates and bit life, and lowered mud costs. Supplied in a semi-liquid, easy-to-use state. Polydril is available at Dowell stations in 5-gallon cans.

PARAFFIN SOLVENT — a non-chlorinated, concentrated, oil-soluble chemical solution designed to dissolve paraffin, even when complicated by asphalt, salt, sand, gum, or wax. Packed in easy-to-handle 10-gallon steel drums. Sold at Dowell stations and major supply stores.

For Ammonia Producers Expanding to

UREA

. . . . . to profit from more effective fertilizers, completely safe animal nutrients, improved plastics . . .

Future Markets Require Purer Grades

. . . . . especially agriculture—where product contamination is damaging to crops, toxic to cattle . . .

Purer Grades Need Improved Processes

. . . . . the *Montecatini* * Processes—which minimize equipment corrosion, virtually eliminate biuret content . . .

Improved Processes Want Better Plants

. . . . . engineered to get maximum product purity and yield at optimum investment and operating costs . . .

Better Plants are Built by M. W. Kellogg

The M. W. Kellogg Company, 711 Third Avenue, New York 17

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Companhia Kellogg Brasileira, Rio de Janeiro • Compania Kellogg de Venezuela, Caracas

* New Kellogg brochure available on request